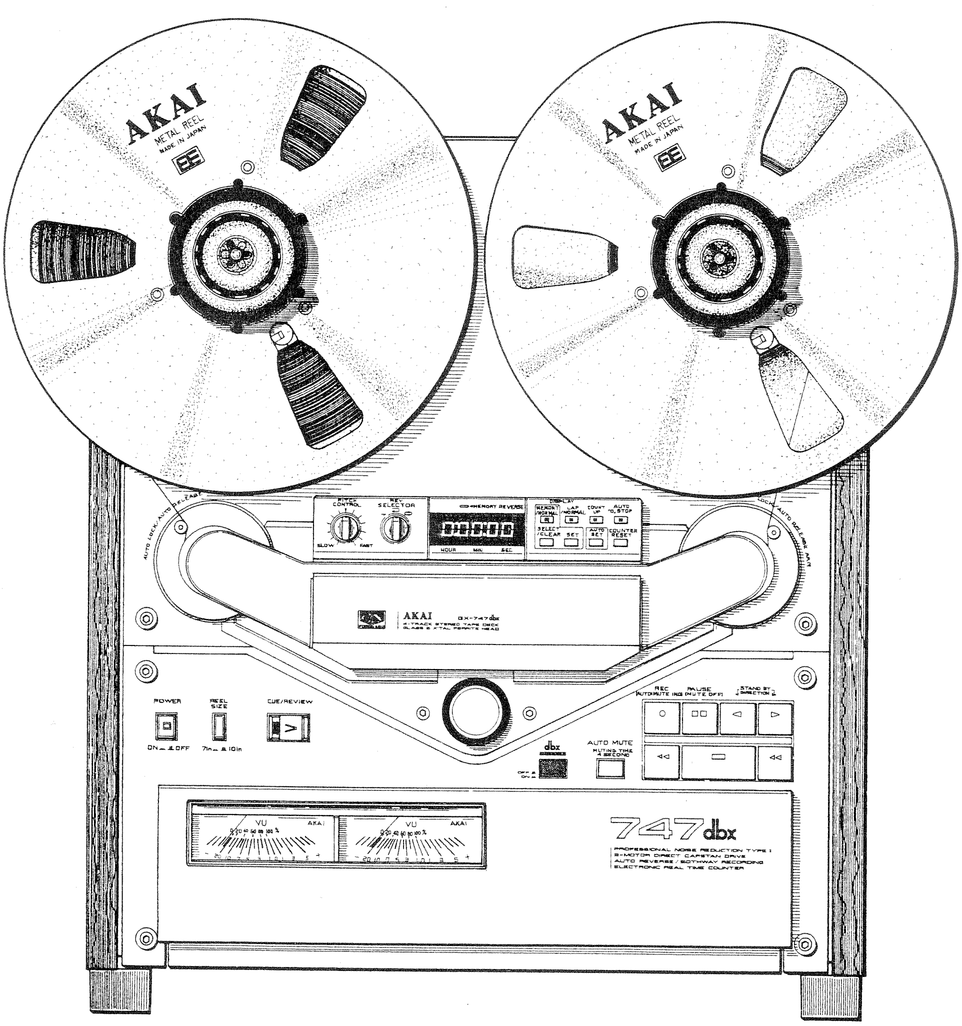
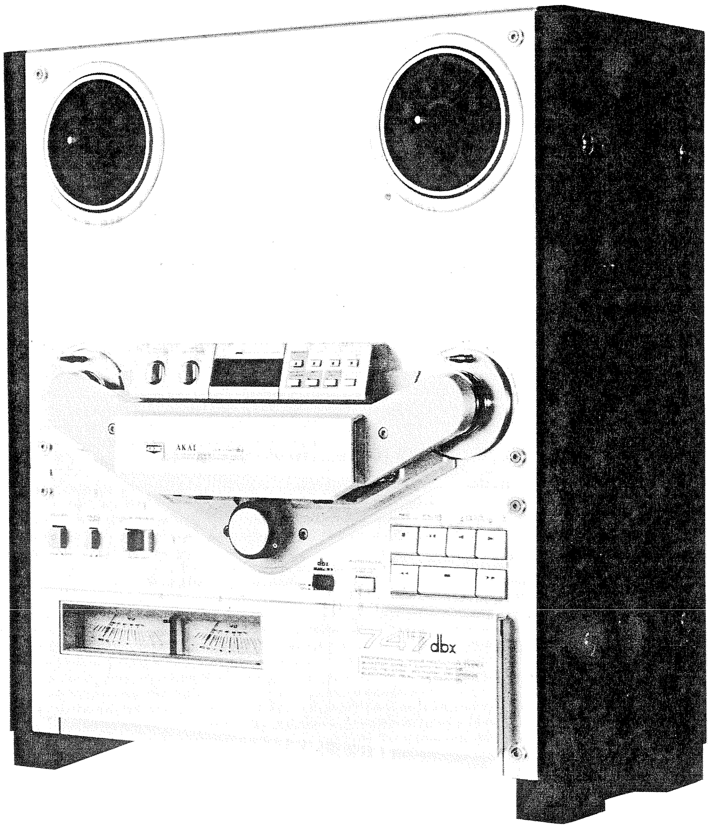
# AKAI SERVICE MANUAL



STEREO TAPE DECK

## MODEL GX-747dbx



# STEREO TAPE DECK

# MODEL GX-747dbx

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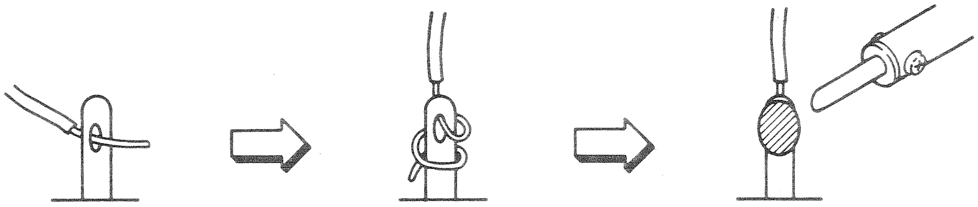
# SAFETY INSTRUCTIONS

## SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for $\boxed{C}$ or $\boxed{A}$, specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks. line-in-out jacks etc.)

## PRECAUTIONS DURING SERVICING

1. Parts identified by the ⚠ symbol parts are critical for safety.
   Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
   Examples: RF .converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers (Insulating Barriers)
   4) Insulation sheets for transistors
   5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SECTION 1

# SERVICE MANUAL

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

# I. SPECIFICATIONS

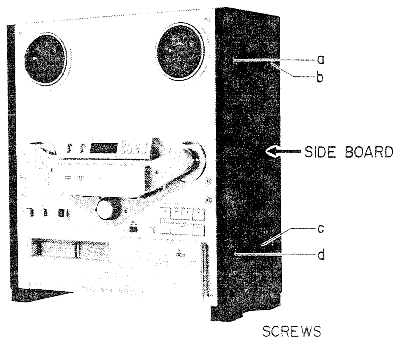
| | |
|---|---|
| TRACK SYSTEM | 4 Track 2 Channel Stereo System |
| REEL CAPACITY | Up to 10" reel |
| HEADS | GX head for Recording x 2<br>GX head for Playback x 2<br>Erase head x 2 |
| MOTORS | AC Servo motor for capstan drive x 1<br>AC Eddy current motor for reel drive x 2 |
| TAPE SPEED | 19 cm/s ± 0.8% (7-1/2 ips.)<br>9.5 cm/s ± 1.0% (3-3/4 ips.) |
| WOW & FLUTTER | Less than 0.03% WRMS, 0.07% DIN 45500 at 19 cm/s<br>Less than 0.04% WRMS, 0.09% DIN 45500 at 9.5 cm/s |
| TAPE WINDING TIME | 75 sec. using 360 m (1,200 ft.) Tape |
| FREQUENCY RESPONSE | 25 to 33,000 Hz ± 3 dB at 19 cm/s<br>25 to 26,000 Hz ± 3 dB (0 VU)<br>25 to 25,000 Hz ± 3 dB at 9.5 cm/s<br>25 to 15,000 Hz ± 3 dB (0 VU) |
| SIGNAL TO NOISE RATIO | Better than 65 dB at 19 cm/s DIN 45500 |
| DYNAMIC RANGE | 128 dB (dbx Switch "ON", 1,000 Hz Peak Recording level) |
| HARMONIC DISTORTION | Less than 0.4% at 19 cm/s |
| INPUT | MIC: 0.25 mV<br>Required microphone impedance: 600 ohms<br>Line: 70 mV |
| OUTPUT | Line: 410 mV at 0 VU<br>Required load impedance: more than 20 kohms<br>Phone: 1.3 mW |
| DIN | Input: 2 mV (input impedance 10 kohms)<br>Output: 0.3 V<br>Required load impedance: more than 20 khoms |
| POWER REQUIREMENTS | 100 V, 50/60 Hz for Japan<br>110 V/120 V/220 V/240 V, 50/60 Hz switchable for the other countries. |
| POWER CONSUMPTION | JPN 80W<br>U/T 140W |
| DIMENSIONS | 440 (W) x 493 (H) x 256 (D) mm<br>(17.3 x 19.4 x 10.1 inches) |
| WEIGHT | 23.2 kg (51.0 lbs) |

* For improvement purposes, specifications and design are subject to change without notice.
* "dbx" is Trademark of dbx Incorporated.

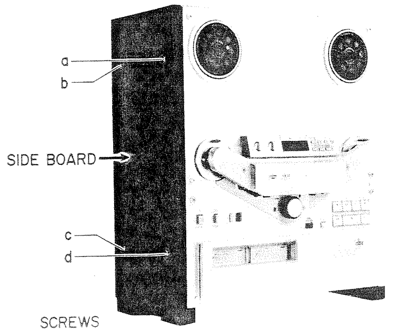
# II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.

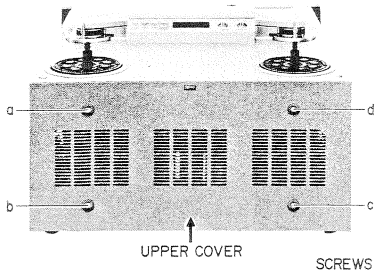
1


a
b
SIDE BOARD
c
d
SCREWS

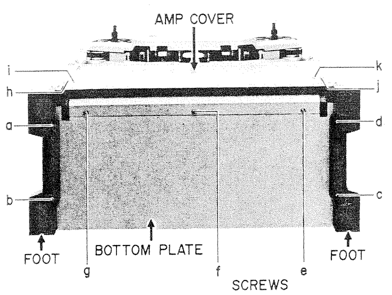
2


a
b
SIDE BOARD
c
d
SCREWS

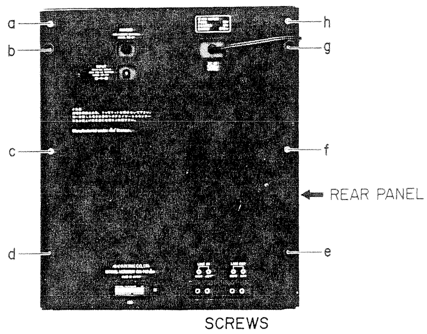
3


a
d
b
c
UPPER COVER
SCREWS

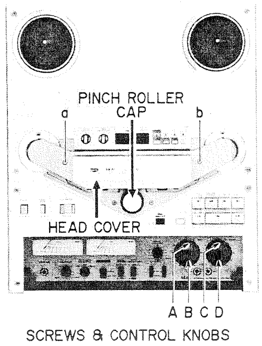
4


AMP COVER
i
h
k
j
a
d
b
c
FOOT
BOTTOM PLATE
FOOT
g
f
e
SCREWS

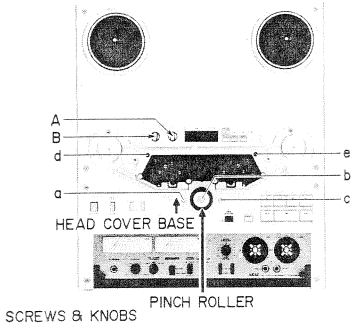
5


a
b
h
g
c
f
REAR PANEL
d
e
SCREWS

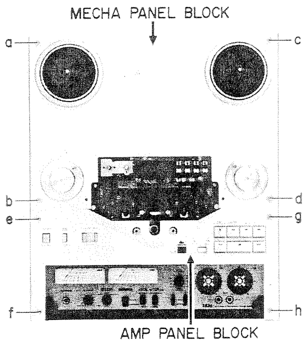
6


PINCH ROLLER CAP
a
b
HEAD COVER
A B C D
SCREWS & CONTROL KNOBS

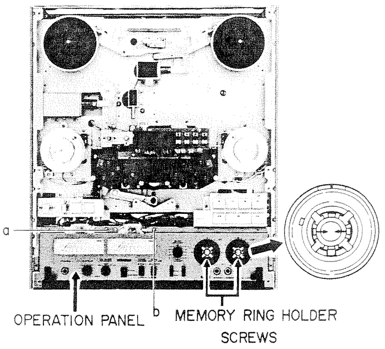
7


A
B
d
e
b
a
c
HEAD COVER BASE
PINCH ROLLER
SCREWS & KNOBS

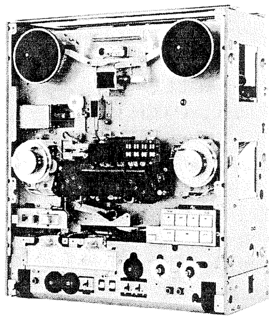
8


MECHA PANEL BLOCK
a
c
b
e
d
g
f
h
AMP PANEL BLOCK

9


a
OPERATION PANEL
b
MEMORY RING HOLDER
SCREWS

10



# III. CONTROLS

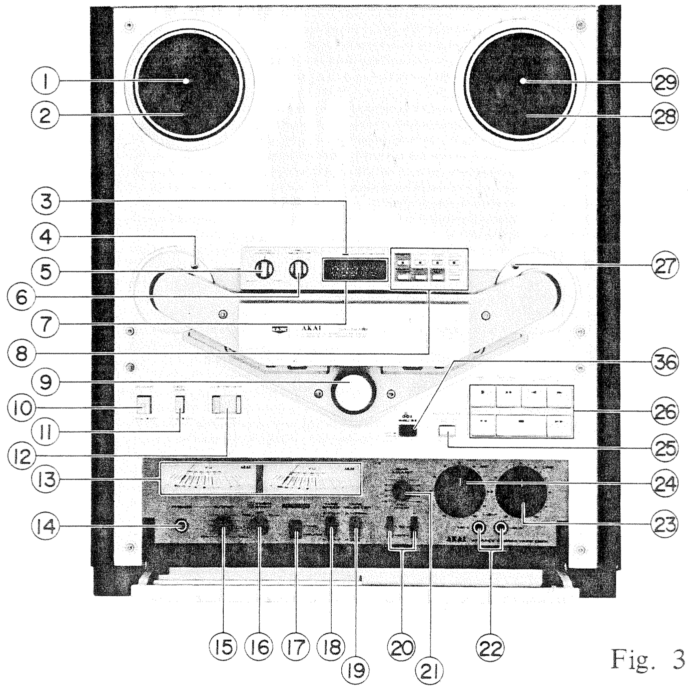


Fig. 3-1 Front View

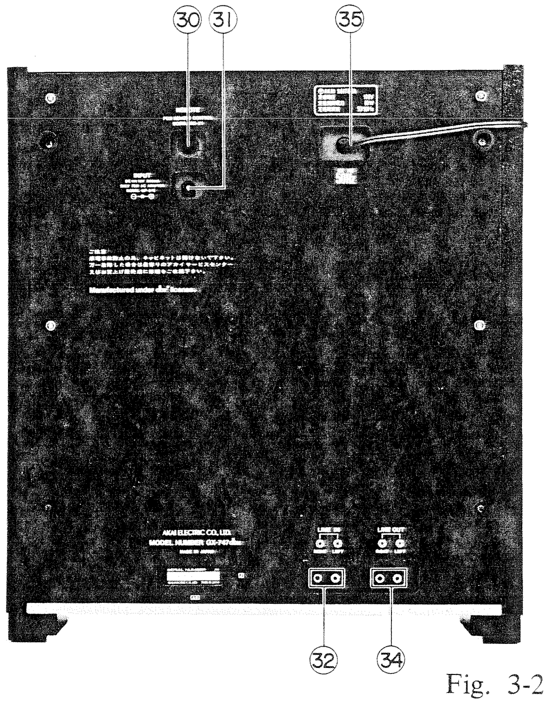


Fig. 3-2 Rear View

1. BUILT-IN REEL RETAINER
2. SUPPLY REEL TABLE
3. MEMORY REVERSE INDICATOR
4. LEFT TENSION ARM (SENSING PIN)
5. PITCH CONTROL
6. REVERSE SELECTOR SWITCH
7. ELECTRONIC DIGITAL REAL TIME COUNTER
8. AUTO TIME COUNTER SYSTEM
9. PINCH ROLLER
10. POWER SWITCH
11. REEL SIZE SELECTOR
12. CUE/REVIEW LEVER
13. VU METERS
14. HEADPHONE JACK
15. OUTPUT LEVEL CONTROL
16. TIMER START SWITCH
17. MONITOR SELECTOR
18. TAPE SPEED SELECTOR
19. TAPE SELECTOR SWITCH
20. TRACK SELECTOR SWITCHES
21. BIAS ADJUSTMENT VOLUME
22. MICROPHONE JACKS
23. LINE INPUT CONTROLS
24. MICROPHONE INPUT CONTROLS
25. AUTO MUTE BUTTON
26. OPERATING BUTTONS
27. RIGHT TENSION ARM (SENSING PIN)
28. TAKE-UP REEL TABLE
29. BUILT-IN REEL TABLE
30. REMOTE CONTROL JACK
31. AC ADAPTER JACK
32. LINE IN JACKS

34. LINE OUT JACKS
35. POWER CORD
36. dbx NOISE REDUCTION SWITCH

# IV. PRINCIPAL PARTS LOCATION

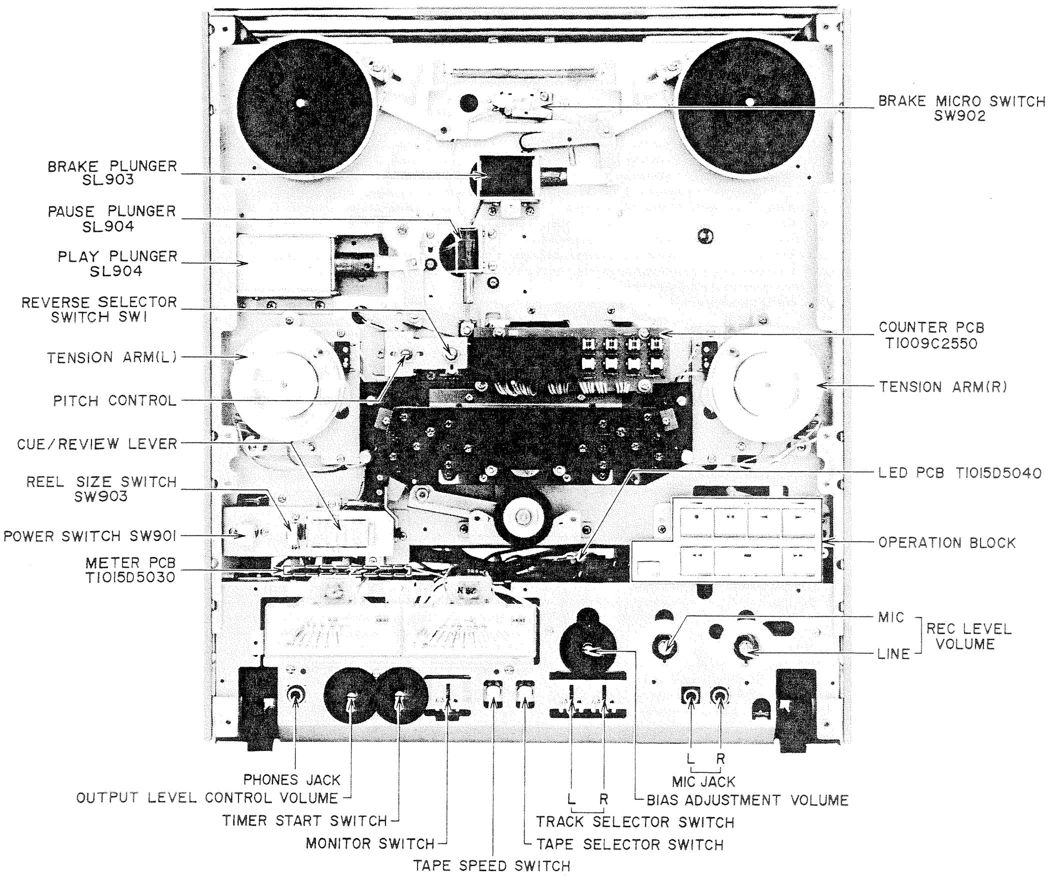

BRAKE MICRO SWITCH SW902
BRAKE PLUNGER SL903
PAUSE PLUNGER SL904
PLAY PLUNGER SL904
REVERSE SELECTOR SWITCH SW1
COUNTER PCB T1009C2550
TENSION ARM(L)
TENSION ARM(R)
PITCH CONTROL
CUE/REVIEW LEVER
LED PCB T1015D5040
REEL SIZE SWITCH SW903
POWER SWITCH SW901
OPERATION BLOCK
METER PCB T1015D5030
MIC
LINE
REC LEVEL VOLUME
L R
MIC JACK
PHONES JACK
OUTPUT LEVEL CONTROL VOLUME
L R
BIAS ADJUSTMENT VOLUME
TIMER START SWITCH
TRACK SELECTOR SWITCH
MONITOR SWITCH
TAPE SELECTOR SWITCH
TAPE SPEED SWITCH

Fig. 4-1 Front View

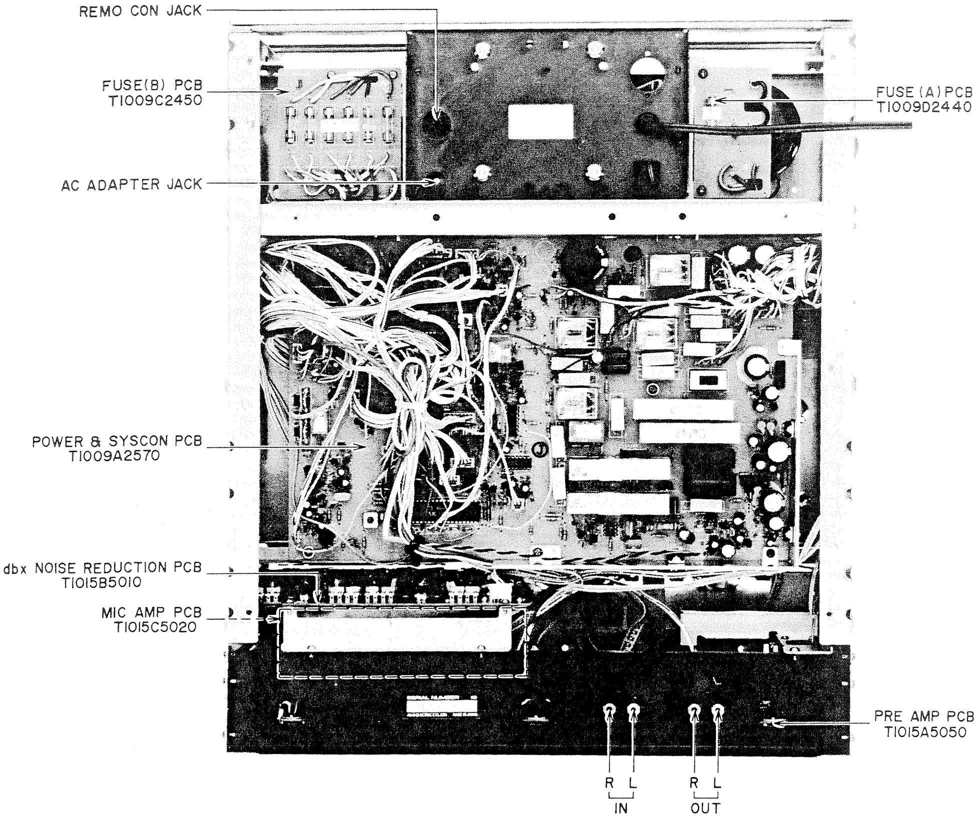

REMO CON JACK
FUSE(B) PCB T1009C2450
FUSE(A) PCB T1009D2440
AC ADAPTER JACK
POWER & SYSCON PCB T1009A2570
dbx NOISE REDUCTION PCB T1015B5010
MIC AMP PCB T1015C5020
PRE AMP PCB T1015A5050
R L
IN
R L
OUT

Fig. 4-2 Rear View

# V. VOLTAGE AND CYCLE CONVERSION

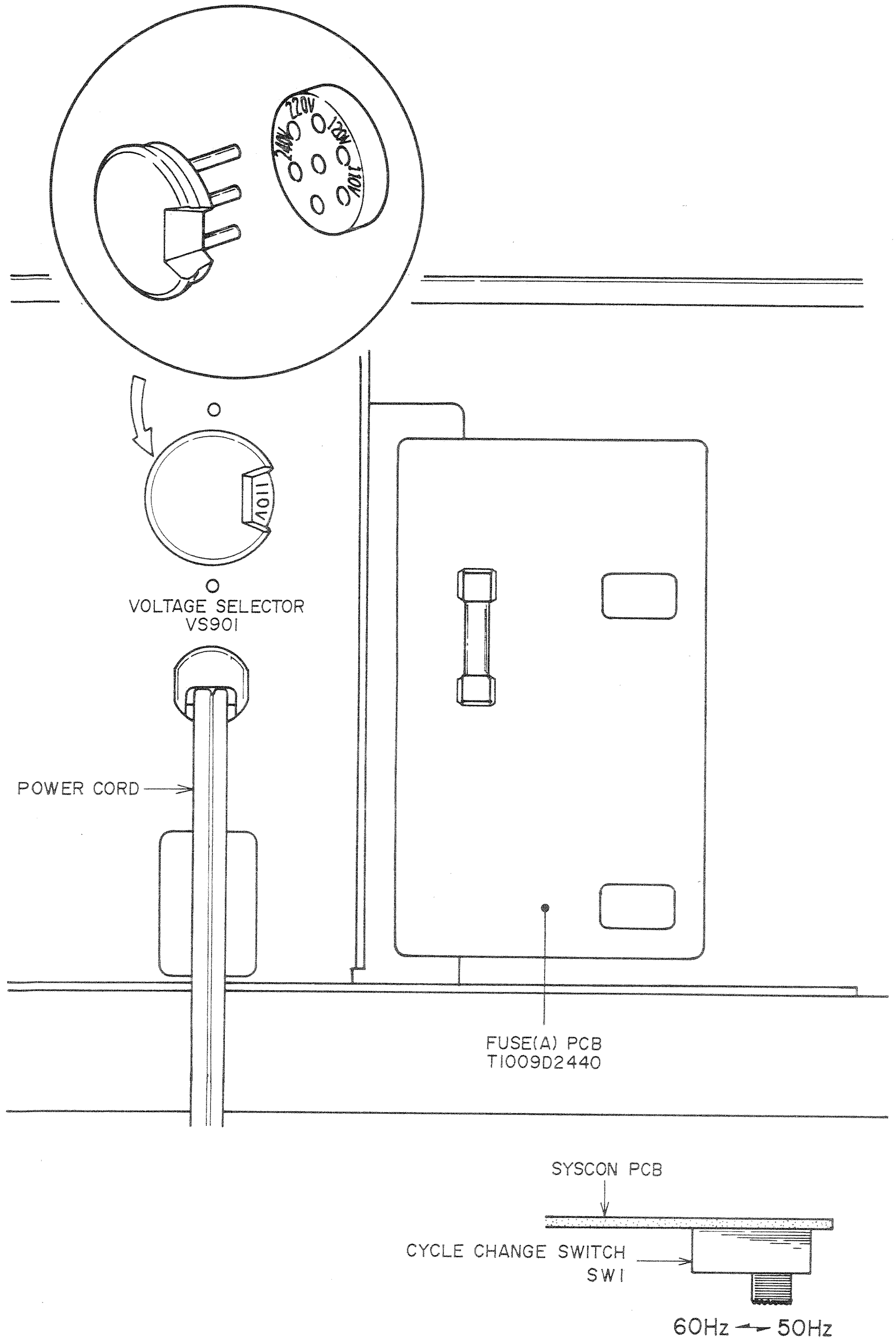

220V
120V
240V
110V
110V
VOLTAGE SELECTOR
VS901
POWER CORD
FUSE(A) PCB
T1009D2440
SYSCON PCB
CYCLE CHANGE SWITCH
SW1
60Hz ⇄ 50Hz

Fig. 5-1 Voltage Conversion (U/T Model) and Cycle Conversion (U/T, JPN Model)

### 1. VOLTAGE CONVERSION (Refer to Fig. 5-1)

U/T Model (110V/120V/220V/240V, 50/60 Hz)

Remove the back board and look for the voltage selector on the upper right portion of the machine. Change the position of voltage selector plugs so that the voltage to be used coincides with the voltage shown through the opening of voltage selector plug. Fuse change is not necessary.

### 2. CYCLE CONVERSION (Refer to Fig. 5-1)

Remove the back board and select the position of switch located in the recess at right portion of Syscon P.C Board to correspond to the frequency of power to be used. Move the switch to the right for 50 Hz and to the left for the 60 Hz.

# VI. DESCRIPTION OF CIRCUIT OPERATION

GX-747 dbx is made by adding the dbx noise reduction system to GX-747. It is functionally identical to the GX-747 except for the dbx noise reduction system. The VU Meter is used for GX-747 dbx.

## 1. OUTLINE

The open deck has made a progress by increasing the performance of deck itself from 4 track 19 cm/sec. to 2 track 38 cm/sec. On the other hand, the cassette has tried to catch up with the performance of the open deck by rapidly improving the software, i. e., the recording tape.

But now for the open deck, too, a software, EE tape (extra efficiency tape) has been developed adding an advantage to the special features of the open deck such as long time recording and wide dynamic range. By using the EE tape, GX-747dbx 9.5 cm/sec. will have the same performance as that of the conventional 19 cm/sec., and the largest shortcoming of the open deck, i. e., troublesome tape loading has been eliminated by using the power lock system (tension arm is automatically locked by motor).

## 2. DETAILS AND FEATURES OF EE TAPE

1) "High range MOL" can be improved and "high linearity" can be obtained by using the cobalt addition type magnetic substance having high coercive force.
2) Playback equalizer of EE tape position

| Tape Speed | Conventional Type | EE Position |
|---|---|---|
| 38 cm/sec. | NAB 3,180 $\mu$S + 50 $\mu$S | NAB 3,180 $\mu$S + 35 $\mu$S |
| 19 cm/sec. | NAB 3,180 $\mu$S + 50 $\mu$S | NAB 3,180 $\mu$S + 35 $\mu$S |
| 9.5 cm/sec. | NAB 3,180 $\mu$S + 90 $\mu$S | NAB 3,180 $\mu$S + 50 $\mu$S |
| 4.75 cm/sec. | NAB 3,180 $\mu$S + 90 $\mu$S | NAB 3,180 $\mu$S + 70 $\mu$S |

3) The REC bias is set 30% or more larger than the conventional position.
4) Since the REC equalizer has high peaking frequency and less equalizing amount, the transient characteristic is improved.

Improvement in Record/Playback S/N ratio

| Tape Speed (cm/s) | Tape Type | 1 kHz Noise Level (dB) | 10 kHz Noise Level (dB) |
|---|---|---|---|
| 19 | EE Tape | –74 | –66 |
|  | Conventional Hi Fi Tape | –71 | –63 |
| 9.5 | EE Tape | –71 | –66 |
|  | Conventional Hi Fi Tape | –71 | –62 |

Fig. 6-1

Improvement in MOL (3% distortion level)

| Tape Speed (cm/s) | Tape Type | 1 kHz (VU) | 10 kHz (VU) | 15 kHz (VU) | 20 kHz (VU) |
|---|---|---|---|---|---|
| 19 | EE Tape | +15 | +10 | +8 | +5 |
|  | Conventional Hi Fi Tape | +15 | +7 | +3 | +0.5 |
| 9.5 | EE Tape | +14 | +4 | 0 |  |
|  | Conventional Hi Fi Tape | +13 | +1 | –6 |  |

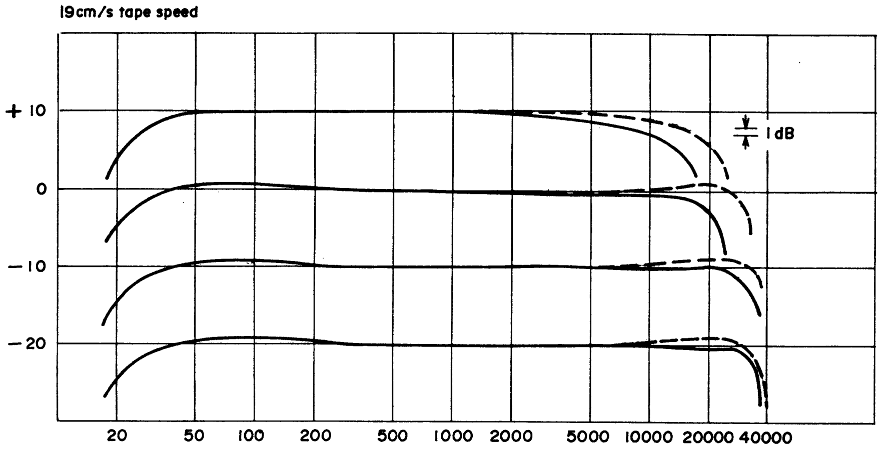
Fig. 6-2

10 kHz D Range Comparison

| Tape Speed (cm/s) | Tape Type | 10 kHz MOL Noise Level (dB) | 10 kHz D Range (dB) |
|---|---|---|---|
| 19 | EE Tape | +10 ~ –66 | 76 |
|  | Conventional Hi Fi Tape | + 6 ~ –63 | 70 |
| 9.5 | EE Tape | + 4 ~ –66 | 70 |
|  | Conventional Hi Fi Tape | + 1 ~ –62 | 63 |

Fig. 6-3

F characteristics comparison of newly developed EE tape and conventional Hi Fi Tape



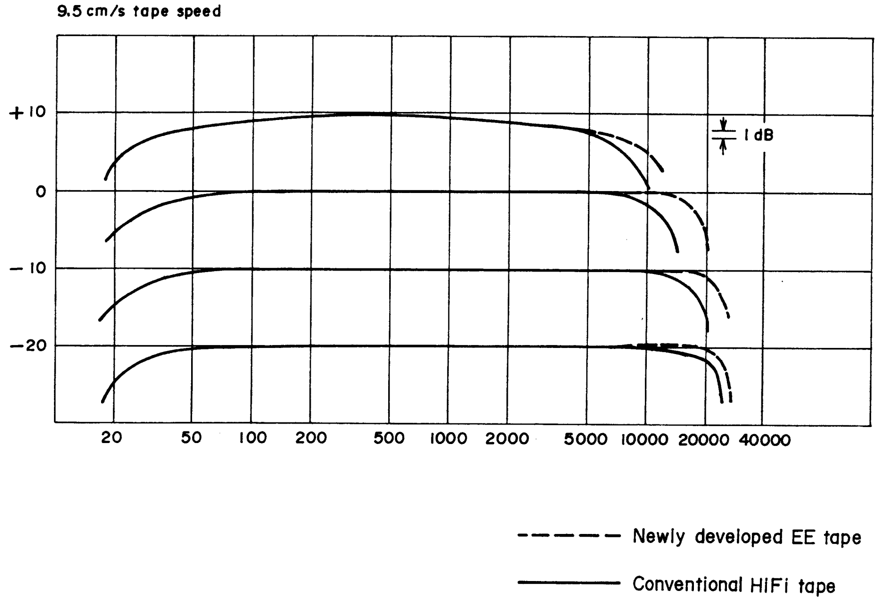


Fig. 6-4

S/N Ratio for Record/Playback

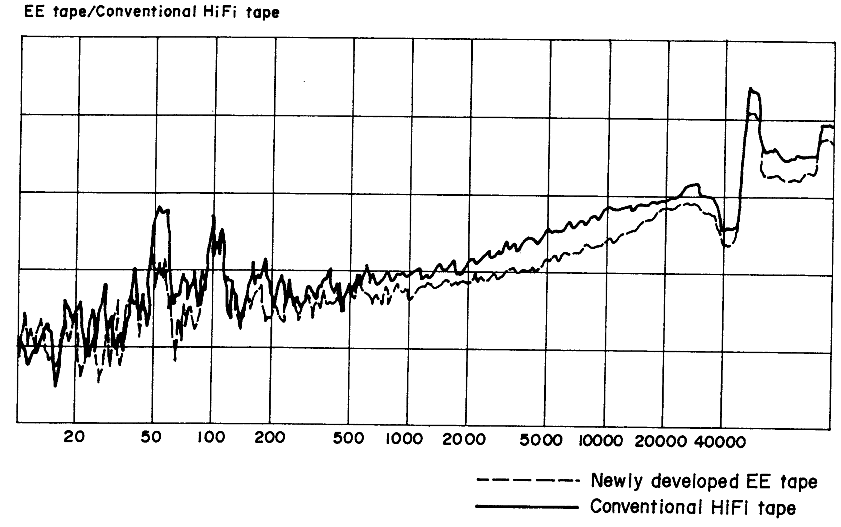


Fig. 6-5

## 3. dbx NOISE REDUCTION SYSTEM

The dynamic range of actual sounds of orchestra, rock band, etc. far exceeds 100 dB. On the other hand, the dynamic range of recording systems such as disk and tape has so far been limited to 50-70 dB due to the saturation level and noise characteristics. The dbx noise reduction system is one of the attempts to improve on the above drawback.

In this system, the dynamic range in decibels of the input signal is halved during recording, and doubled during playback after recording to return it to original range. The system makes it possible to record and playback signals whose dynamic range exceeds 100 dB through a tape deck whose dynamic range is the normal 50-60 dB. (Refer to Fig. 6-6)

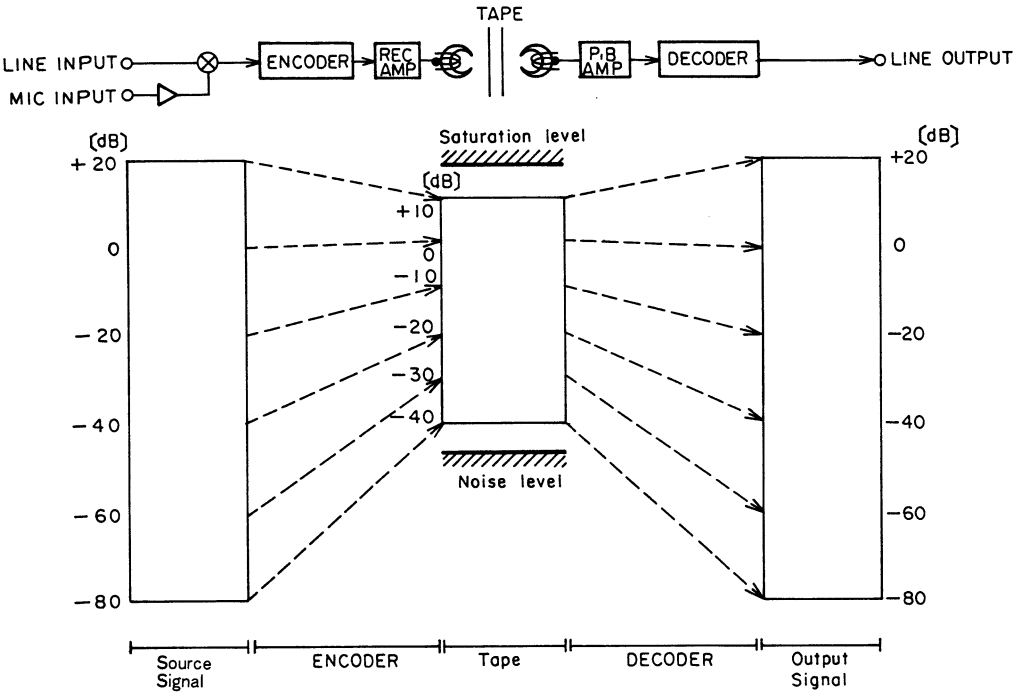


Fig. 6-6 Encode and Decode

The dbx system largely consists of the encoder and decoder. The basic operation of the encoder/decoder is as follows:

### Encoder operation

As shown in Fig. 6-7, the input signal range in decibels is halved. For example, –60 dB input signal is changed to –30 dB, and +20 dB signal is reduced to +10 dB. After the encoder, the signal is sent to the recording amplifier, and recorded on the tape. That is, the 80 dB dynamic range of the original signal is reduced to 40 dB. In this case, when the user tries to record the original signal with the tape deck having 60 dB dynamic range, the 20 dB difference from the 80 dB signal range should have been sacrificed by the tape noise or saturation distortion, but thanks to the operation of the dbx encoder, the dynamic range of 40 dB thus obtained covers the 80 dB input range sufficiently.

### Decoder operation

The encoded playback output signal of the tape deck which has passed through the playback amplifier from the PB head is sent to the decoder. The dynamic range in decibels is doubled according to the decode characteristic shown in Fig. 6-7. For example, a –30 dB signal is changed to –60 dB, and the noise level is also lowered by 30 dB, which gives the so-called noise reduction effect. Similarly, a +10 dB signal is increased to +20 dB, so that the saturation characteristic on the tape has apparently been improved by 10 dB. The saturation ceiling level is increased, hence the dynamic range of the tape deck is effectively increased, and the original sound can be reproduced without its wide dynamic range being affected.

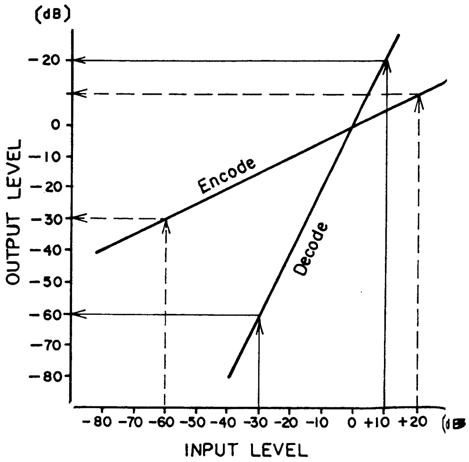


Fig. 6-7 Input/Output

# 4. EXPLANATION OF EACH OPERATING PRINCIPLES

Amplifier Block Diagrams

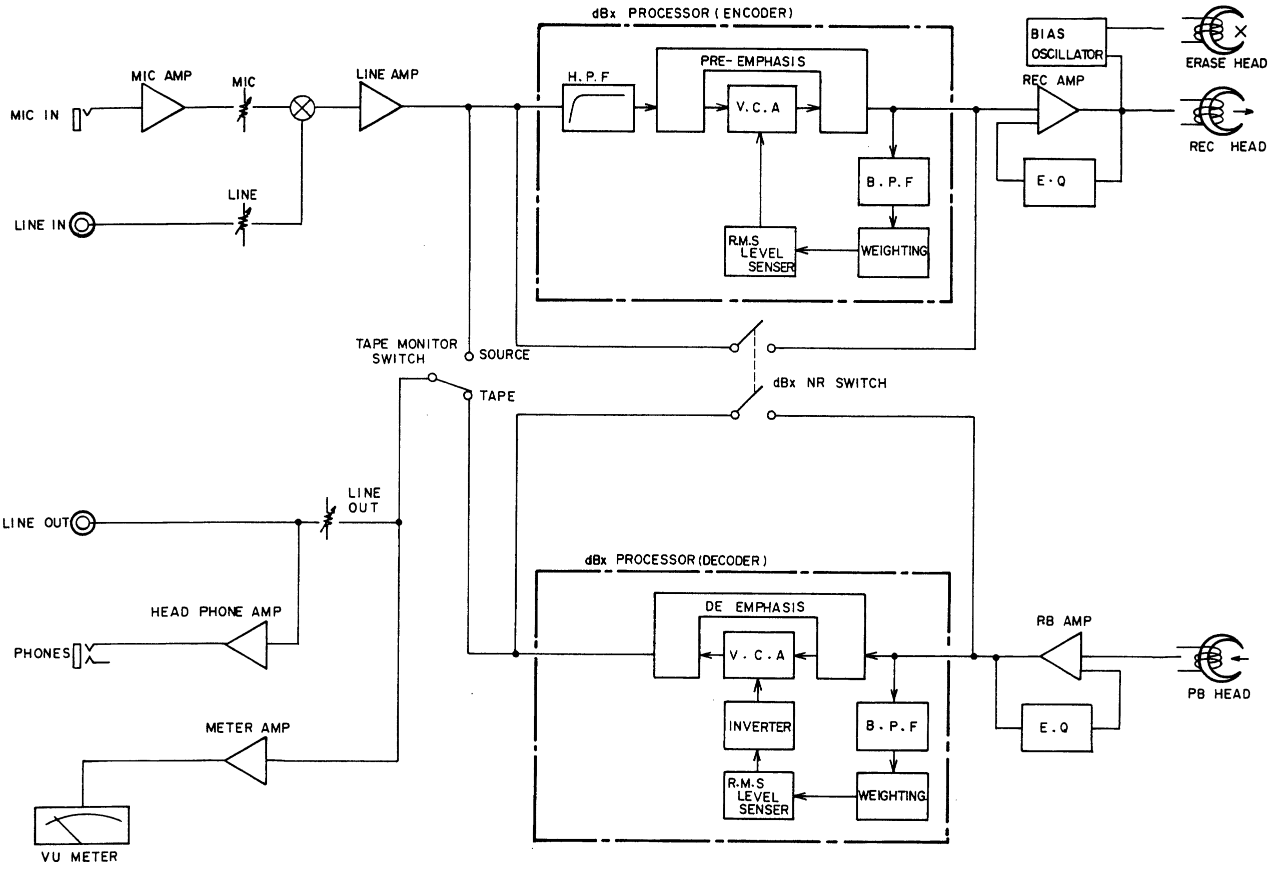

dBx PROCESSOR ( ENCODER)
MIC AMP
MIC
LINE AMP
H. P. F
PRE- EMPHASIS
V. C. A
BIAS OSCILLATOR
ERASE HEAD
REC AMP
REC HEAD
MIC IN
LINE
LINE IN
B . P. F
E · Q
R.M.S LEVEL SENSER
WEIGHTING
TAPE MONITOR SWITCH
SOURCE
TAPE
dBx NR SWITCH
LINE OUT
LINE OUT
dBx PROCESSOR (DECODER)
DE EMPHASIS
HEAD PHONE AMP
PB AMP
PHONES
V . C . A
PB HEAD
METER AMP
INVERTER
B . P. F
E . Q
R.M.S LEVEL SENSER
WEIGHTING
VU METER

Fig. 6-8 Amplifier Block Diagram

## 4-1 dbx NOISE REDUCTION SYSTEM CIRCUIT

The main circuits composing this system provide the pre-emphasis, de-emphasis, VCA (Voltage Controlled Attenuator or Amplifier), RMS (Root Mean Square) action, level sensor, etc. (Refer to Fig. 6-8). Each circuit will be described below:

### 4-1-1 INPUT FILTER (HPF)

This filter, which is a high-pass filter (HPF) of about 20 Hz cutoff (fcut) frequency and –12 dB/oct slope, is formed by a positive feedback active filter. Here, the filter is made into an active filter using a transistor to improve the shoulder characteristic of the filter and to act as a buffer to eliminate the effect of following circuits due to their impedance characteristics. (Refer to Figs. 6-9 and 6-10)

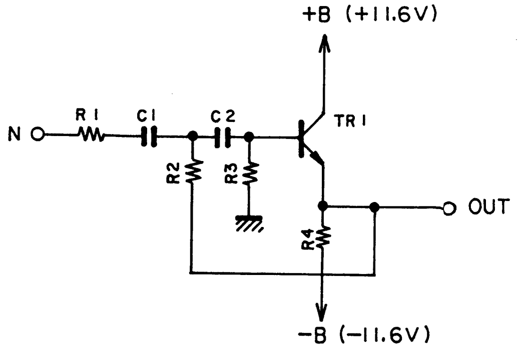

+B (+11.6V)
IN
R1
C1
C2
TR1
R2
R3
OUT
R4
–B (–11.6V)

Fig. 6-9 INPUT Filter Circuit

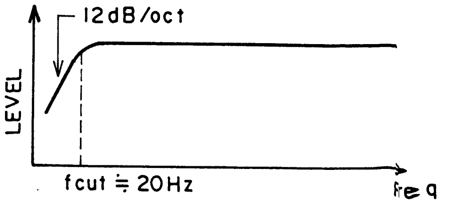


Fig. 6-10 Input Filter Characteristic

## 4-1-2 PRE-EMPHASIS CIRCUITS

(Refer to Figs. 6-11 and 6-12)

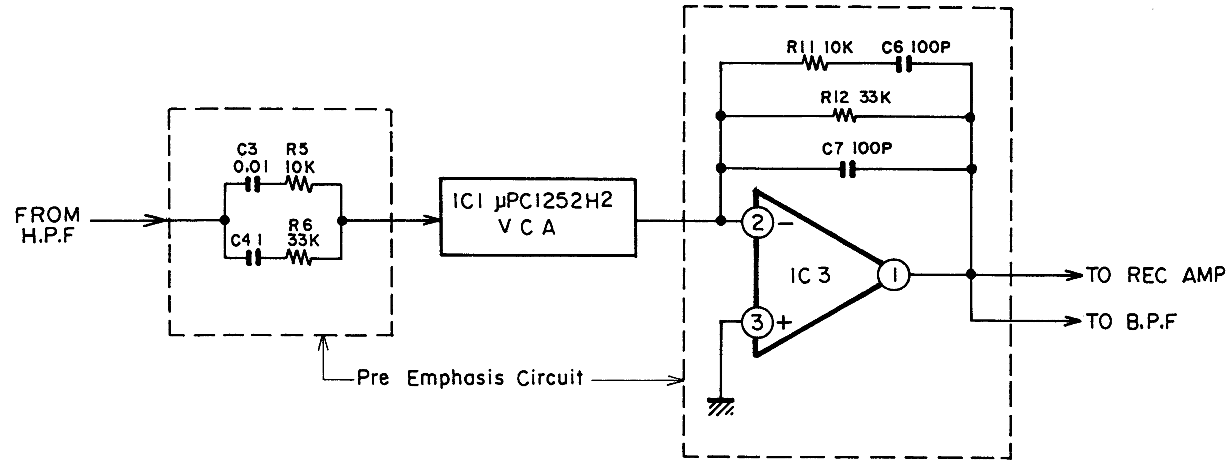


Fig. 6-11 Pre-emphasis Circuit

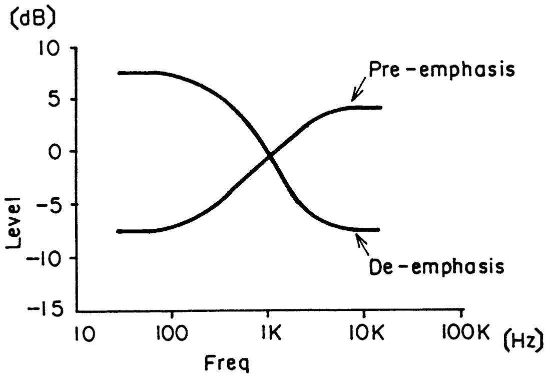


Fig. 6-12 Pre-emphasis and De-emphasis Characteristics

The primary role of this circuit is to play the same role as the equalizer used with the record or other recording media by pre-emphasis of the high frequency band to reduce high band noise, and to reduce the breathing phenomenon (Note 1).

During playback, the high frequency band is de-emphasized to return the signal to the original state. In Fig. 6-11, the time constant of the Low band is determined in the first stage, and the time constant of the high band and the emphasis value is determined in the last stage. C3 and C4 provide AC coupling to prevent the DC offset of the previous stage from being modulated by the change in the VCA gain. The first stage also serves to convert the input voltage to a current source, while the last stage converts the current to a voltage output. C7 is an oscillation preventing capacitor. (Refer to Fig. 6-11)

Note 1. It is generally well-known that noise (hiss noise) added by the tape recorder or tape deck has a high content of high frequency band components.

In the dbx system, compander gain changes according to the level of the intermediate and low frequency band components which are the main components in the input, but hiss noise also varies according to the gain change. As a result, hiss noise changes as the level of the main signal component changes, and "breathing" noise is heard. This is called the breathing phenomenon.

Of course intermediate and low frequency band noise changes similarly, but since intermediate/low band signal components are strong, this noise is masked by these strong signals, and it is not sensed by the ears. Hiss noise consisting of high frequency band components is not masked by the signal components and is therefore easily detected by ear.

### 4-1-3 DE-EMPHASIS CIRCUIT (Figs. 6-12 and 6-13)

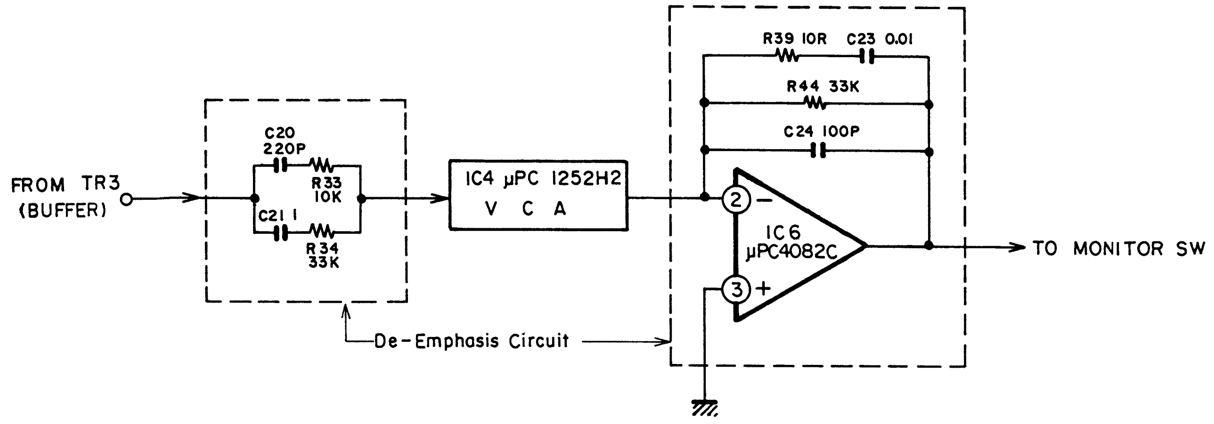

FROM TR3
(BUFFER)
C20
220P
R33
10K
C21 1
R34
33K
IC4 µPC 1252H2
V C A
R39 10R
C23 0.01
R44 33K
C24 100P
IC6
µPC4082C
TO MONITOR SW
De-Emphasis Circuit

Fig. 6-13 De-emphasis Circuit

In contrast to the pre-emphasis circuit which pre-emphasizes the high frequency band during recording, this circuit de-emphasizes the high frequency band during playback to restore the signal to its original state. The circuit configuration is the same as the pre-emphasis circuit, but has some differences in component values.

### 4-1-4 VCA (Voltage Controlled Amplifier (or Attenuator)) CIRCUIT (Refer to Figs. 6-14,6-15,6-16)

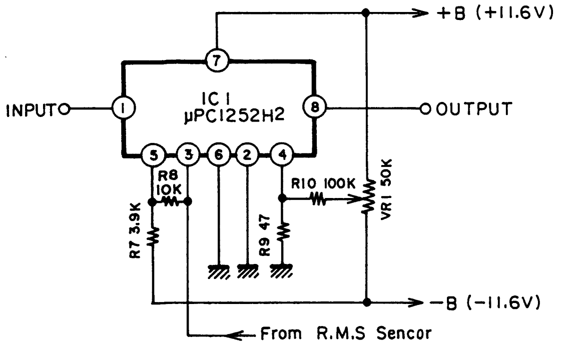

+B (+11.6V)
INPUT
IC 1
µPC1252H2
OUTPUT
R8 10K
R7 3.9K
R10 100K
R9 47
VR1 50K
-B (-11.6V)
From R.M.S Sencor

Fig. 6-14 Encoder

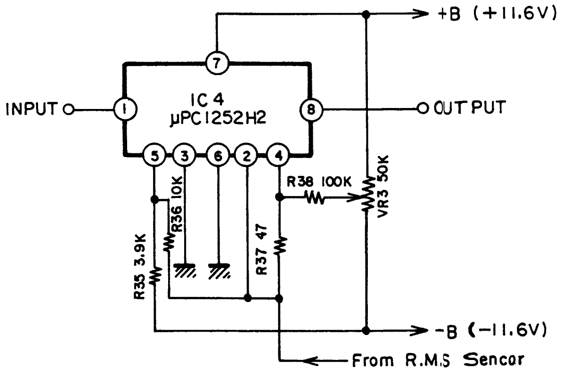

+B (+11.6V)
INPUT
IC 4
µPC1252H2
OUTPUT
R38 100K
VR3 50K
R36 10K
R35 3.9K
R37 47
-B (-11.6V)
From R.M.S Sencor

Fig. 6-15 Decoder

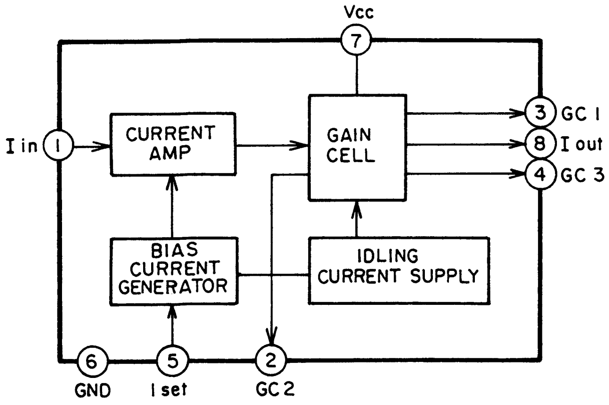

Vcc
I in
CURRENT AMP
GAIN CELL
BIAS CURRENT GENERATOR
IDLING CURRENT SUPPLY
GC 1
I out
GC 3
GND
I set
GC 2

Fig. 6-16 IC µPC1252H2 Internal Block Diagram

IC1 and IC4 (µPC1252H2) are dbx VCA circuit ICs. Pin ① is a virtual ground, and accepts only an input signal current. Pin ⑧ is a high impedance current output.

Pin ⑤ is connected to negative power supply through the current setting internal bias circuit. The set current is nominally 2 mA. The range is compressed in the encode mode when the RMS sensor output is positive. In the decode mode, since the RMS sensor output is fed to Pin ② with Pin ③ being GND, the range is expanded when the RMS sensor output is positive, and it is compressed when the RMS sensor output is negative, which is just the opposite action to the encode mode.

The circuit consisting of R9(R37), R10(R38), and VR1 (VR3) can make symmetrical adjustment possible and minimize DC offset voltage which is multiplied by the circuit gain, and control the second order harmonic distortion. When a fast gain change is commanded, DC offset appears at the output. R8 (R36) are provided to reduce this. In the encoder (Fig. 6-14), it acts as a logarithmic amplifier, while it acts as an anti-logarithmic amplifier in the decoder (Fig. 6-15). Fig. 6-16 shows IC µPC1252H2 block diagram.

### 4-1-5 LEVEL SENSOR FILTER OR BAND PASS FILTER (Figs. 6-17 and 6-18)

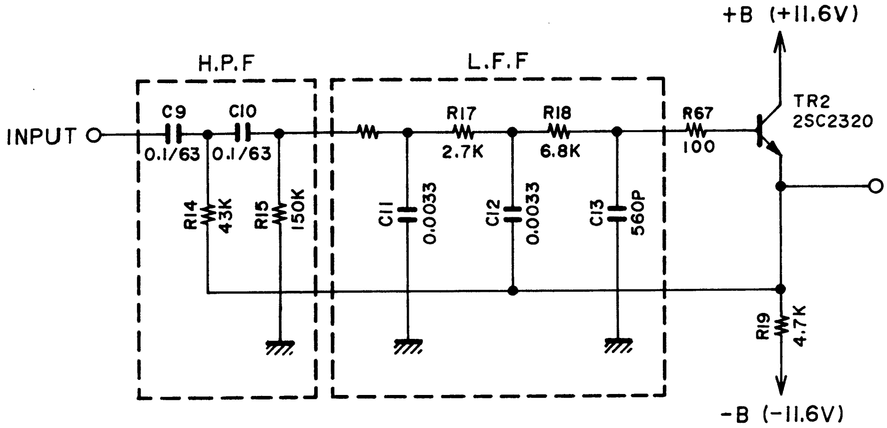

+B (+11.6V)
H.P.F
L.F.F
INPUT
C9
C10
0.1/63
0.1/63
R14
43K
R15
150K
R17
2.7K
R18
6.8K
C11
0.0033
C12
0.0033
C13
560P
R67
100
TR2
2SC2320
OUTPUT
R19
4.7K
-B (-11.6V)

Fig. 6-17 Level Sensor Filter Circuit

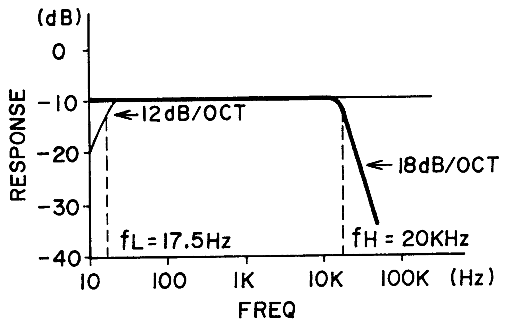


Fig. 6-18 Level Sensor Filter Characteristic

This filter circuit is a BPF (Band Pass Filter) in which the third order LPF (Low Pass Filter) and the second order HPF (High Pass Filter) are combined.

The purpose of this filter circuit is to prevent gain error occurrence by attenuating the characteristic of the level sensor in the region where the frequency response of the tape deck is not flat. (Misoperation prevention).

As shown, in the GX-747 dbx, fL=17.5 Hz and fH=20 kHz.

### 4-1-6 WEIGHTING NETWORK (Figs. 6-19 and 6-20)

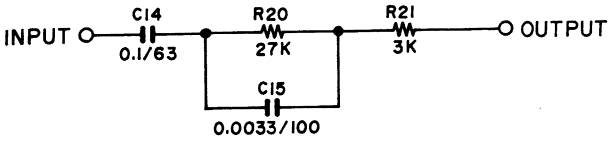

INPUT
C14
0.1/63
R20
27K
R21
3K
OUTPUT
C15
0.0033/100

Fig. 6-19 Weighting Network Circuit

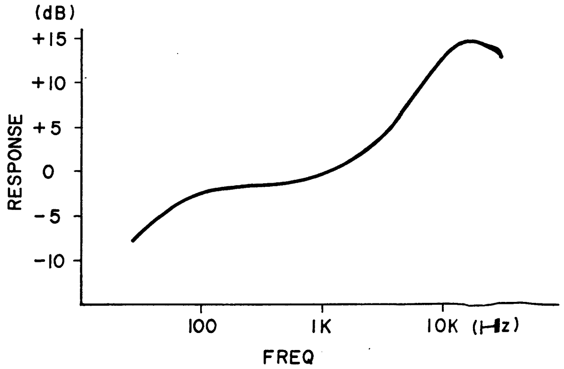


Fig. 6-20 Weighting Network Characteristic

If signals in which the high frequency band is emphasized by the pre-emphasis circuit, are directly recorded by the tape deck, the high frequency band saturation level of the tape might be exceeded. The weighting network prevents this by lowering the amplification of the VCA (Voltage Controlled Amplifier) by a corresponding amount in the case of signals containing many high frequency band components. For this reason, a weighting network as shown in Fig. 6-19 which has the characteristic as shown in Fig. 6-20 is provided before the RMS sensor circuit. The weighting network raises the sensitivity of the level sensor for signals with a high content of high frequency band components, and lowers the amplification of the VCA.

## 4-1-7 RMS (ROOT MEAN SQUARE) LEVEL SENSOR (Figs. 6-21 and 6-22)

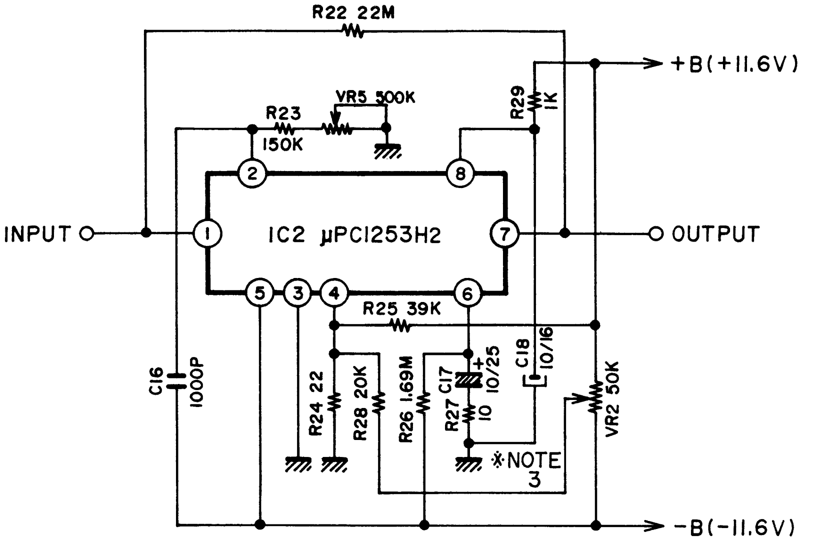

R22 22M
+B(+11.6V)
VR5 500K
R23
150K
R29 1K
2
8
INPUT
1
IC2 μPC1253H2
7
OUTPUT
5
3
4
6
R25 39K
C16 1000P
R24 22
R28 20K
R26 1.69M
R27 10
C17 10/25
C18 10/16
VR2 50K
*NOTE 3
-B(-11.6V)

Fig. 6-21 RMS Level Sensor Circuit

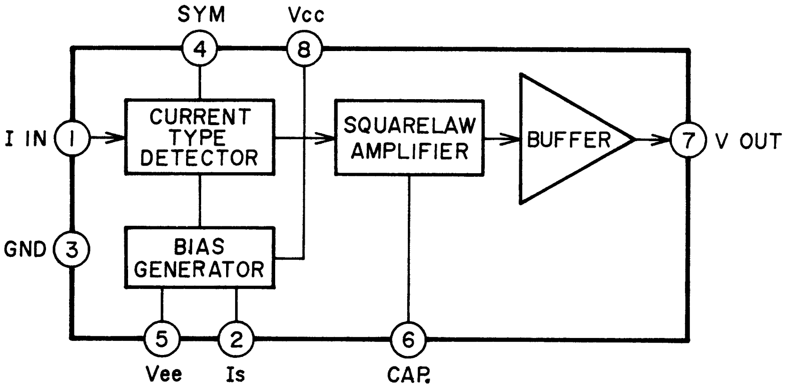

SYM
Vcc
4
8
I IN
1
CURRENT TYPE DETECTOR
SQUARELAW AMPLIFIER
BUFFER
7
V OUT
GND
3
BIAS GENERATOR
5
2
6
Vee
Is
CAP.

Fig. 6-22 IC μPC1253H2 Block Diagram

The RMS level sensor circuit detects the effective value (RMS) of input signal current, and converts it to a DC voltage proportional to the logarithm of the detected level.

IC2 and IC5 (μPC1253H2) are for the dbx RMS level sensor circuit.

Fig. 6-21 shows the RMS level sensor circuit. For pre-setting the control signal (0V at zero point level) for the input level, zero point level control is made possible by varying the operating current of IC by means of VR5. (Zero point level=410 mV=–5.5 dB ref 1mW 600 ohms (0.774 volts))

The attack time is 15 ms when there is a 10 dB level change (increase), 5 ms when there is a 20 dB change, and 3 ms when there is a 30 dB change. The decay rate (Note 2) is 125 dB/sec as standard. Time constant is determined by the current ($I_T$) flowing through R26, and by C17.

In the GX-747 dbx, since $I_T$=7.5 μA, in the equation for obtaining the decay rate of 125 dB/sec, C=10μF from $I_T$=0.75 C.

C18 is a by-pass capacitor, and the charging current of C17 flows through C18. C16 is a capacitor provided to obtain stability and low distortion characteristics in the high frequency band. R25 serves as a level shift for bringing the control value to the center. VR2 is a volume control for symmetry adjustment.

R22 prevents any "thump" sound when there is no signal.

Note 2. Slope of the output voltage change after an abrupt large drop of the input signal level.

Note 3. GND is used for common, otherwise mis-operation may result due to the large current flowing during the recovery time.

## 4-1-8 POWER SUPPLY CIRCUIT (For dbx NR Circuit)
(Refer to Figs. 6-23 and 6-24)

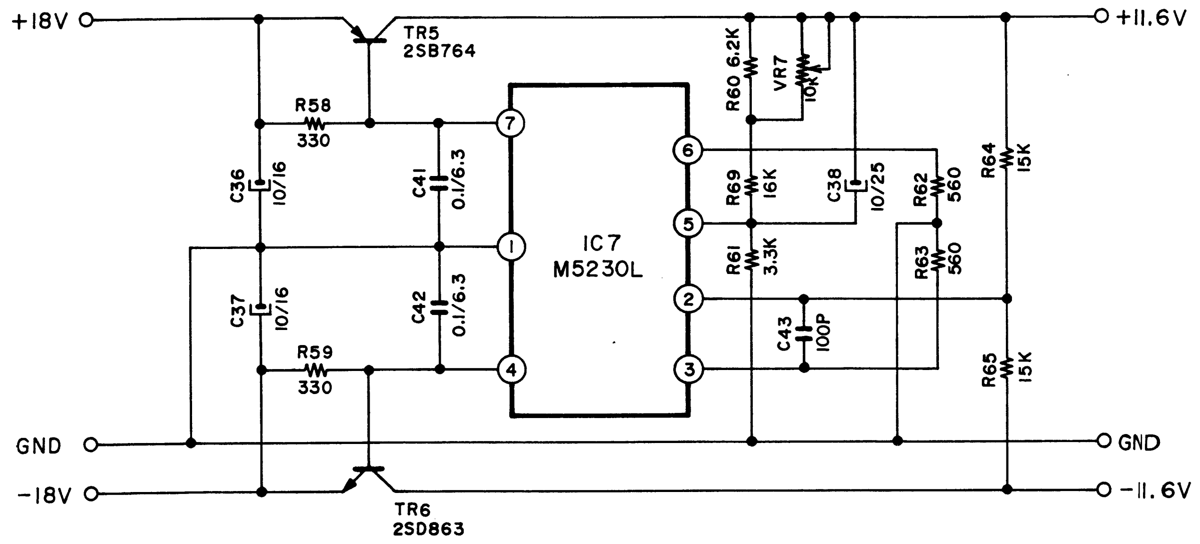

+18V
TR5
2SB764
R58
330
C36
10/16
C41
0.1/6.3
IC7
M5230L
R60 6.2K
VR7
10K
R69
16K
C38
10/25
R62
560
R64
15K
R61
3.3K
R63
560
C43
100P
R65
15K
C37
10/16
C42
0.1/6.3
R59
330
7
6
5
1
2
3
4
+11.6V
GND
GND
-18V
-11.6V
TR6
2SD863

Fig. 6-23 Power Supply Circuit for dbx NR Circuit

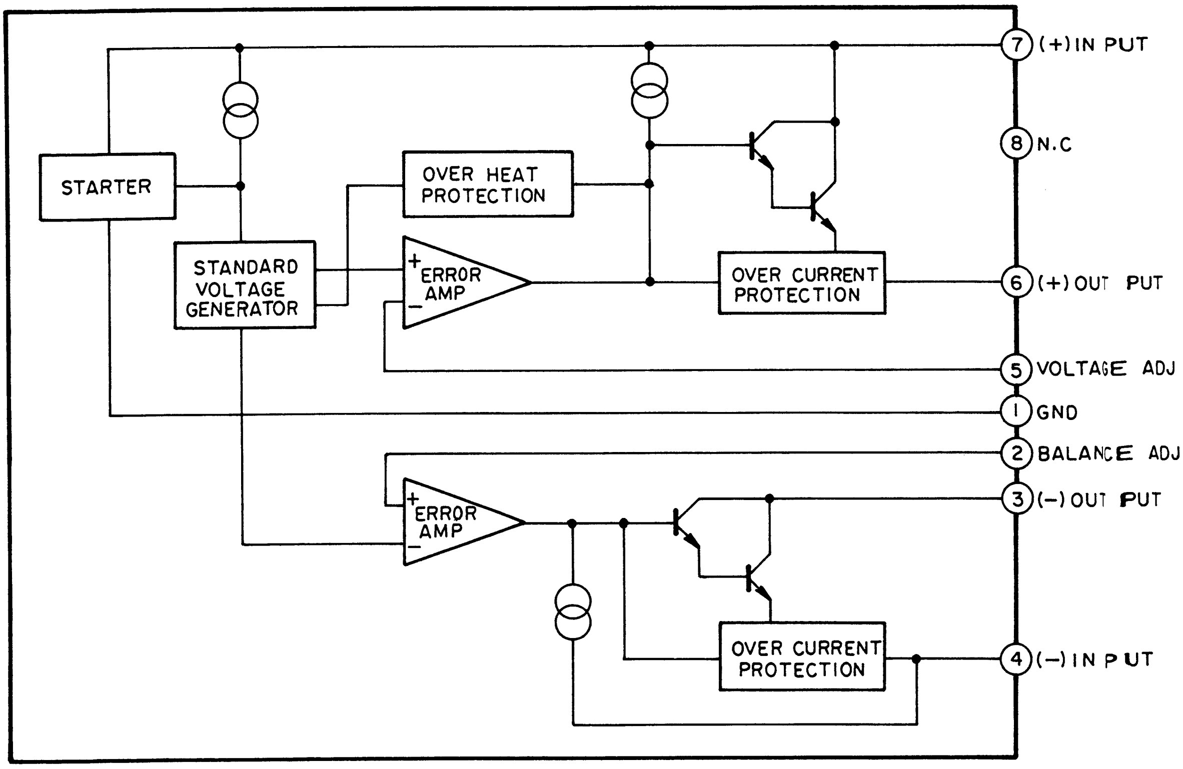

STARTER
OVER HEAT PROTECTION
STANDARD VOLTAGE GENERATOR
+ ERROR AMP −
OVER CURRENT PROTECTION
+ ERROR AMP −
OVER CURRENT PROTECTION
7 (+) IN PUT
8 N.C
6 (+) OUT PUT
5 VOLTAGE ADJ
1 GND
2 BALANCE ADJ
3 (−) OUT PUT
4 (−) IN PUT

Fig. 6-24 IC M5230L Block Diagram

IC7 (M5230L) is an IC for the dual tracking regulator. The tracking regulator is a stabilized power supply in which a change in either the positive or negative output voltage due to the load (or otherwise), is followed by a similar change in the other voltage.

When it is used for the DC amplifier, etc., any offset voltage due to supply voltage fluctuation can be prevented.

Figs. 6-23 and 6-24 show the power supply circuit and IC M5230L block diagram respectively. In the power supply circuit of Fig. 6-23, the output voltage is controlled by changing the reference voltage applied to Pin ⑤ of IC (M5230L) through the resistor dividing circuit consisting of R61, R69, R60, and VR7. In addition, C38 sets the rise time constant of the output voltage, improves the ripple suppression ratio, and improves the output noise voltage.

R64 and R65 are resistors for balancing the positive and negative output voltages. Though the positive/negative output voltage ratio can be changed by changing this resistance ratio, the positive and negative output voltages are made identical by making R64 equal to R65.

## 4-2. SYSTEM CONTROL

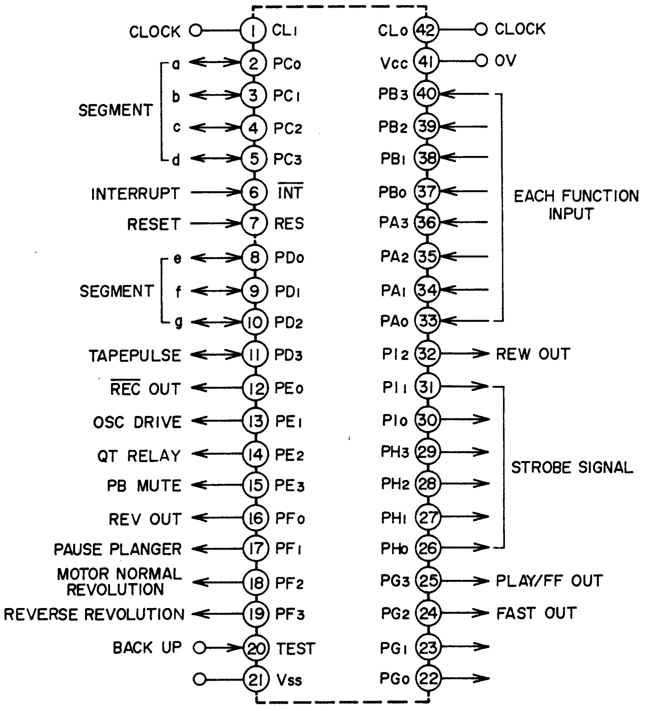
The system control circuit using a microcomputer will carry out the following controls.

① Operational Control of tension arm lock
② Indication of real time counter
③ Operation control of function SW
④ Control of reel motor brake system
⑤ Flashing control of indication lamps

Since the LED indicator and the electronic counter indicator are operated by the timing of pulse, no tester can find the failure.

The failure can only be found by checking the waveform on the oscilloscope.

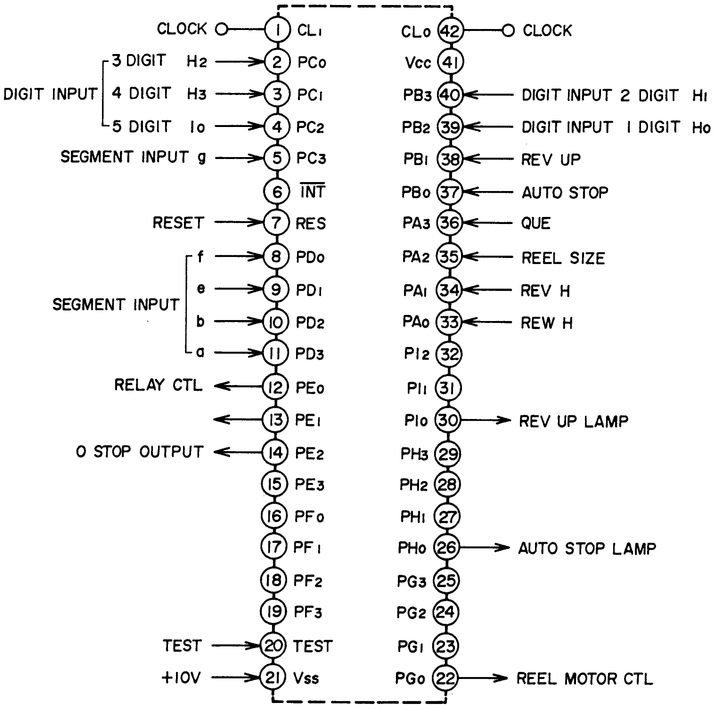
ⓐ IC1 (μPD553C-152) Terminal Description



CLOCK ① CLI
SEGMENT a ② PCo
b ③ PC1
c ④ PC2
d ⑤ PC3
INTERRUPT ⑥ INT
RESET ⑦ RES
SEGMENT e ⑧ PDo
f ⑨ PD1
g ⑩ PD2
TAPEPULSE ⑪ PD3
REC OUT ⑫ PEo
OSC DRIVE ⑬ PE1
QT RELAY ⑭ PE2
PB MUTE ⑮ PE3
REV OUT ⑯ PFo
PAUSE PLANGER ⑰ PF1
MOTOR NORMAL REVOLUTION ⑱ PF2
REVERSE REVOLUTION ⑲ PF3
BACK UP ⑳ TEST
㉑ Vss
CLo ㊷ CLOCK
Vcc ㊶ OV
PB3 ㊵
PB2 ㊴
PB1 ㊳
PBo ㊲
PA3 ㊱
PA2 ㉟
PA1 ㉞
PAo ㉝
EACH FUNCTION INPUT
PI2 ㉜ REW OUT
PI1 ㉛
PIo ㉚
PH3 ㉙
PH2 ㉘
PH1 ㉗
PHo ㉖
STROBE SIGNAL
PG3 ㉕ PLAY/FF OUT
PG2 ㉔ FAST OUT
PG1 ㉓
PGo ㉒

Fig. 6-25

ⓑ IC2 (μPD553C-110) Terminal Description



CLOCK ① CL1
DIGIT INPUT 3 DIGIT H2 ② PCo
4 DIGIT H3 ③ PC1
5 DIGIT Io ④ PC2
SEGMENT INPUT g ⑤ PC3
⑥ INT
RESET ⑦ RES
SEGMENT INPUT f ⑧ PDo
e ⑨ PD1
b ⑩ PD2
a ⑪ PD3
RELAY CTL ⑫ PEo
⑬ PE1
O STOP OUTPUT ⑭ PE2
⑮ PE3
⑯ PFo
⑰ PF1
⑱ PF2
⑲ PF3
TEST ⑳ TEST
+10V ㉑ Vss
CLo ㊷ CLOCK
Vcc ㊶
PB3 ㊵ DIGIT INPUT 2 DIGIT H1
PB2 ㊴ DIGIT INPUT 1 DIGIT Ho
PB1 ㊳ REV UP
PBo ㊲ AUTO STOP
PA3 ㊱ QUE
PA2 ㉟ REEL SIZE
PA1 ㉞ REV H
PAo ㉝ REW H
PI2 ㉜
PI1 ㉛
PIo ㉚ REV UP LAMP
PH3 ㉙
PH2 ㉘
PH1 ㉗
PHo ㉖ AUTO STOP LAMP
PG3 ㉕
PG2 ㉔
PG1 ㉓
PGo ㉒ REEL MOTOR CTL

Fig. 6-26

### 4-2-1 FUNCTION MODE SELECTOR CIRCUIT

Selection of the function mode is controlled by the pulse timing using a microcomputer. For easier understanding, one input terminal ㉟ will be explained as an example. The terminal ㉟ receives four signals, i. e., the strobe signals from ㉖ , ㉗, ㉘ and ㉙ .

Each pulse signal from ㉖ , ㉗ , ㉘ and ㉙ has a different timing. Assuming that the signals from these terminals are 1000, 0100, 0010 and 0001, signal 1000 of Terminal ㉖ will pass D84, and through the collector of TR85, it will enter the emitter of TR60.

If FWD (SW3) button is pressed, the base of TR60 is earthed through R202, TR60 is energized, and Signal 1000 will be outputted into Terminal ㉟ of IC1 through D60.

If any input is made into ㉟ , it is processed within the microcomputer depending on the signal and the signal is outputted from the respective terminal. If 1000 is inputted into ㉟ , it is judged as FWD and the related signal is inputted to the output terminal. (See Fig. 6-27). Similarly, Signal 0100 from ㉗ passes the emitter and collector of TR86 and enters the Counter P.C Board. When the program SW (SW6) is pressed, Signal 0100 is inputted into IC1 ㉟. Signal 0010 from ㉘ passes the collector/emitter of TR87, and through D66 and the reverse selector SW ⟲ , it is inputted into IC1 ㉟. Signal 0001 from ㉙ passes SR1 and SW906 and is inputted into ㉟.

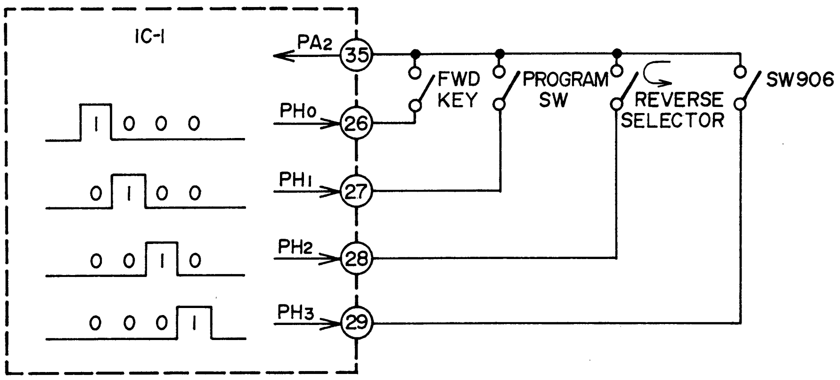


Fig. 6-27

| Input to ㉟ | Judgement and Output by Microcomputer |
|---|---|
| 1000 | Output H to Terminals ⑫ ,⑭,㉔ and ㉕ of IC1 (FWD output order). |
| 0100 | Act as clear/program SW only when MEMORY AUTO REV SW is ON. |
| 0010 | Act once as a reverse equipment. |
| 0001 | (SW 906 is ON and tension arm is locked)<br>When FWD, REV, FF or RWD key is pressed, process the other signals after making Terminal ⑱ H. |

Fig. 6-28

Fig. 6-29 shows the truth table when the function switches are pressed.

| Function SW / Terminal | FF | FWD | STOP | REV | REW | PAUSE | REC | REC MUTE | REC PAUSE |
|---|---|---|---|---|---|---|---|---|---|
| 12 | H | H | H | H | H | H | L | H | H |
| 13 | L | L | L | L | L | L | H | H | H |
| 14 | H | H | L | H | H | L | H | L | L |
| 15 | H | L | H | L | H | L | L | L | L |
| 16 | L | L | L | H | L | L | L | L | L |
| 17 | L | H | L | H | L | H | H | H | H |
| 24 | H | L | L | L | H | L | L | L | L |
| 25 | H | H | L | H | L | L | H | H | L |

Note: H of Terminal ⑭ : ⎽⎍⎽

H of other Terminals: ⎽⎺

Fig. 6-29

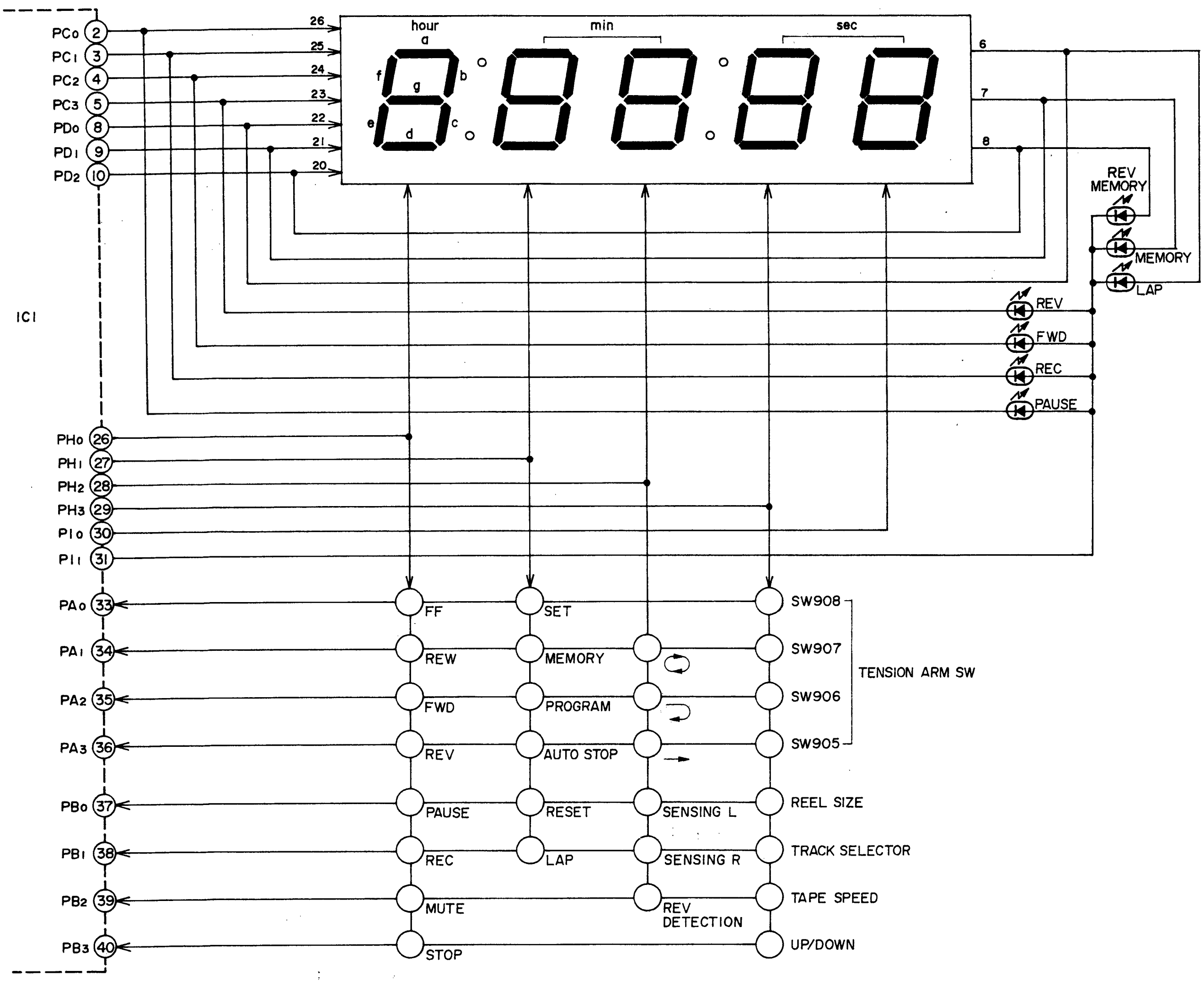

PC0 2
PC1 3
PC2 4
PC3 5
PD0 8
PD1 9
PD2 10
IC1
PH0 26
PH1 27
PH2 28
PH3 29
PI0 30
PI1 31
PA0 33
PA1 34
PA2 35
PA3 36
PB0 37
PB1 38
PB2 39
PB3 40
26
25
24
23
22
21
20
hour
min
sec
a
b
c
d
e
f
g
6
7
8
REV MEMORY
MEMORY
LAP
REV
FWD
REC
PAUSE
FF
REW
FWD
REV
PAUSE
REC
MUTE
STOP
SET
MEMORY
PROGRAM
AUTO STOP
RESET
LAP
SENSING L
SENSING R
REV DETECTION
SW908
SW907
SW906
SW905
TENSION ARM SW
REEL SIZE
TRACK SELECTOR
TAPE SPEED
UP/DOWN

Fig. 6-30

Description of mode switches in Fig. 6-31

| Mode | Description of switches |
|---|---|
| FF | Operation P.C Board SW1 Remocon TR58 |
| RWD | Operation P.C Board SW2 Remocon TR59 |
| FWD | Operation P.C Board SW3 Remocon TR60 |
| REV | Operation P.C Board SW4 Remocon TR61 |
| Pause | Operation P.C Board SW5 Remocon TR62 |
| REC | Operation P.C Board SW6 Remocon TR63 |
| Mute | Operation P.C Board SW7 Remocon TR64 |
| Stop | Operation P.C Board SW8 Remocon TR65 |
| Set | Counter P.C Board SW5 |
| Memory | Counter P.C Board SW1 |
| Program | Counter P.C Board SW6 |
| Automatic Stop | Counter P.C Board SW7 |
| Reset | Counter P.C Board SW8 |
| Lap | Counter P.C Board SW2 |
| Permanent REV | SW P.C Board SW1 ↻ |
| One Time REV | SW P.C Board SW1 ↩ |

| | |
|---|---|
| MON REV | SW P.C Board SW1 ⟶ |
| Sensing L | Sensing Pole L |
| Sensing R | Sensing Pole R |
| REV detection | RL6 |
| SW908 | Take up side tension arm, detection of shut-off position |
| SW907 | Take up side tension arm, detection of arm lock position |
| SW906 | Supply side tension arm, shut-off position |
| SW905 | Supply side tension arm, arm lock position |
| Reel size | SW903 |
| Track selector | Pre Amp SW3 |
| Tape Speed | Tape Speed SW |
| UP/DOWN | Counter P.C Board SW3 |

Fig. 6-31

### 4-2-2 TENSION ARM LOCKING SYSTEM

(Refer to Figs. 6-32 to 6-35)

The tension arm position is detected by means of the microswitch. At the time of shut-off, the tension arm is placed in locked position by the release motor. If any function key (FWD, REV, FF or RWD) is pressed when the tension arm is in the lock position, the release motor starts and after the arm comes to its middle position (i. e., the tape is loaded), such outputs as listed in Fig. 6-29 will be issued from the terminals of IC1.

Truth table of BA6109 (IC 5, 6)

| IN ⑤ Pin | IN ⑥ Pin | V Out 1 ② Pin | V Out 2 ⑩ Pin |
|---|---|---|---|
| H | H | L | L |
| L | H | L | H |
| H | L | H | L |
| L | L | Open | Open |

Fig. 6-32

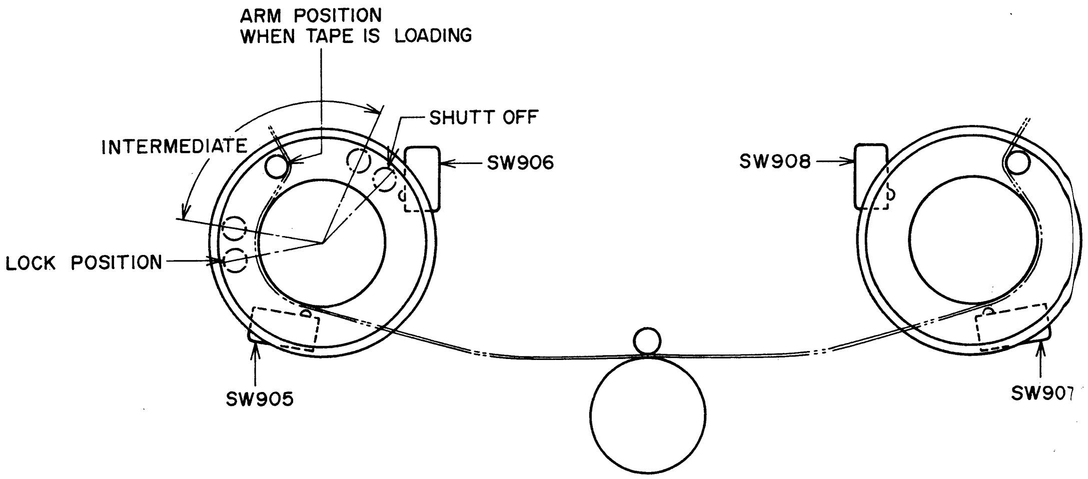


Fig. 6-33

SW positions in accordance with the tension arm positions

| Position of tension arm | SW905 | SW906 | SW907 | SW908 |
|---|---|---|---|---|
| Lock | off | ON | off | ON |
| Middle | ON | off | ON | off |
| Shut-off | off | off | off | off |

Fig. 6-34

Truth table of IC1 Pins ⑱ and ⑲ in accordance with tension arm positions

| ⑱ Pin | ⑲ Pin | |
|---|---|---|
| L | L | Lock |
| H | L | ↓ Play key is pressed |
| L | L | Middle |
| L | H | ↓ Shut-off |
| L | L | Lock |

Fig. 6-35

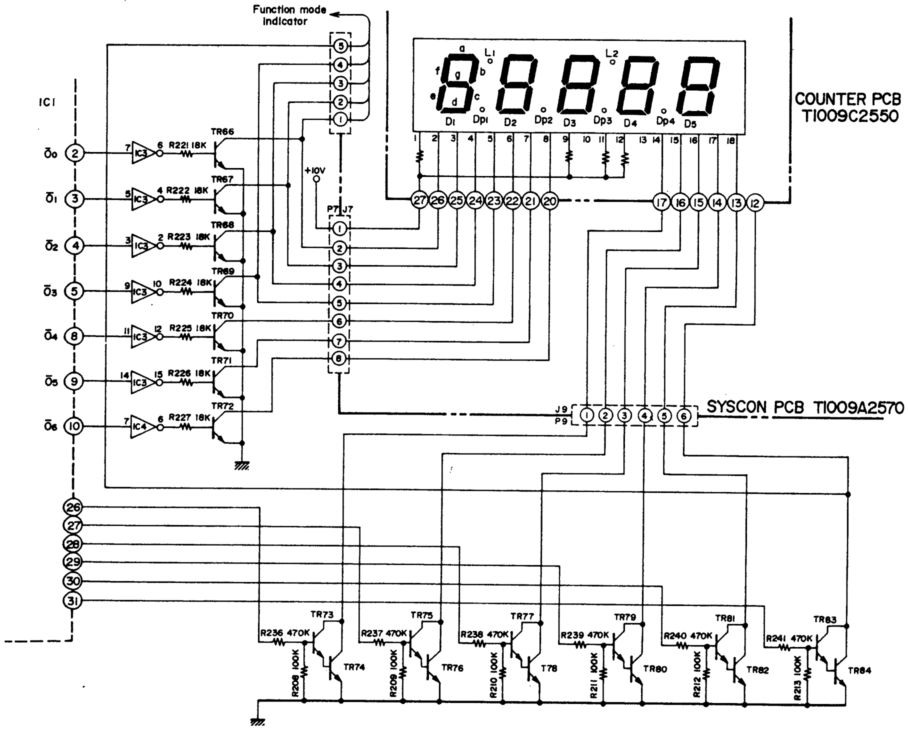

Function mode indicator
IC1
Ō0 ②
Ō1 ③
Ō2 ④
Ō3 ⑤
Ō4 ⑧
Ō5 ⑨
Ō6 ⑩
IC3
IC4
R221 18K
R222 18K
R223 18K
R224 18K
R225 18K
R226 18K
R227 18K
TR66
TR67
TR68
TR69
TR70
TR71
TR72
+10V
P7 J7
a
b
c
d
e
f
g
L1
L2
D1
Dp1
D2
Dp2
D3
Dp3
D4
Dp4
D5
COUNTER PCB
TI009C2550
J9
P9
SYSCON PCB TI009A2570
㉖
㉗
㉘
㉙
㉚
㉛
TR73
TR74
TR75
TR76
TR77
T78
TR79
TR80
TR81
TR82
TR83
TR84
R236 470K
R237 470K
R238 470K
R239 470K
R240 470K
R241 470K
R208 100K
R209 100K
R210 100K
R211 100K
R212 100K
R213 100K

Fig. 6-36

### 4-2-3 FUNCTION MODE INDICATOR CIRCUIT AND COUNTER CIRCUIT

- Function Mode Indicator Circuit

The function mode indicator lighting is also controlled by the operation timing of the control signal from the microcomputer.

Here we will explain about the situation in Fig. 6-37. (FWD PLAY/PAUSE) as one example. Hereinafter FWD PLAY is just written as PLAY. Under PLAY/PAUSE, PAUSE of the function mode indicator is always is lit and PLAY is flashing. Firstly, refer to the vertical raw of the function mode indicators of O0 - O3 in Fig. 6-37. You will note that PAUSE IND has "H" level, PLAY IND has "L/H" flashing and others have "L" level.

The signals of (O0 - O3) and IC ㉛ enter IC3 and IC4 and TR83 in Fig. 6-36. In this way the digits of the function mode ind. and PLAY/PAUSE IND. are inputted. When these two digits are synchronized, the indicator is lit.

- Counter Indicator Circuit

The counter indicators are also lit by the pulse from the microcomputer, and it is not that all the indicators are always lit.

Because of the afterimage, it appears to our eyes that all the digits are lit despite the fact that they are lit in sequence as shown in Fig. 6-38. This system is called dynamic lighting system.

Fig. 6-37 shows the timing chart. By means of the waveforms of IC ㉖ - ㉚ coming from the microcomputer, the lighting position of LED of each digit is moved in sequence. Take the example of the first digit.

The first digit can only be lit when the waveform of IC ㉚ is "H" level. Depending on the condition of O0 - O6 at the time of "H" level, each segment is lit and the figure is indicated. Since the segments of the LED indicators are cathode common, each segment is lit when O0 - O6 are at "H" level. If we see the condi-

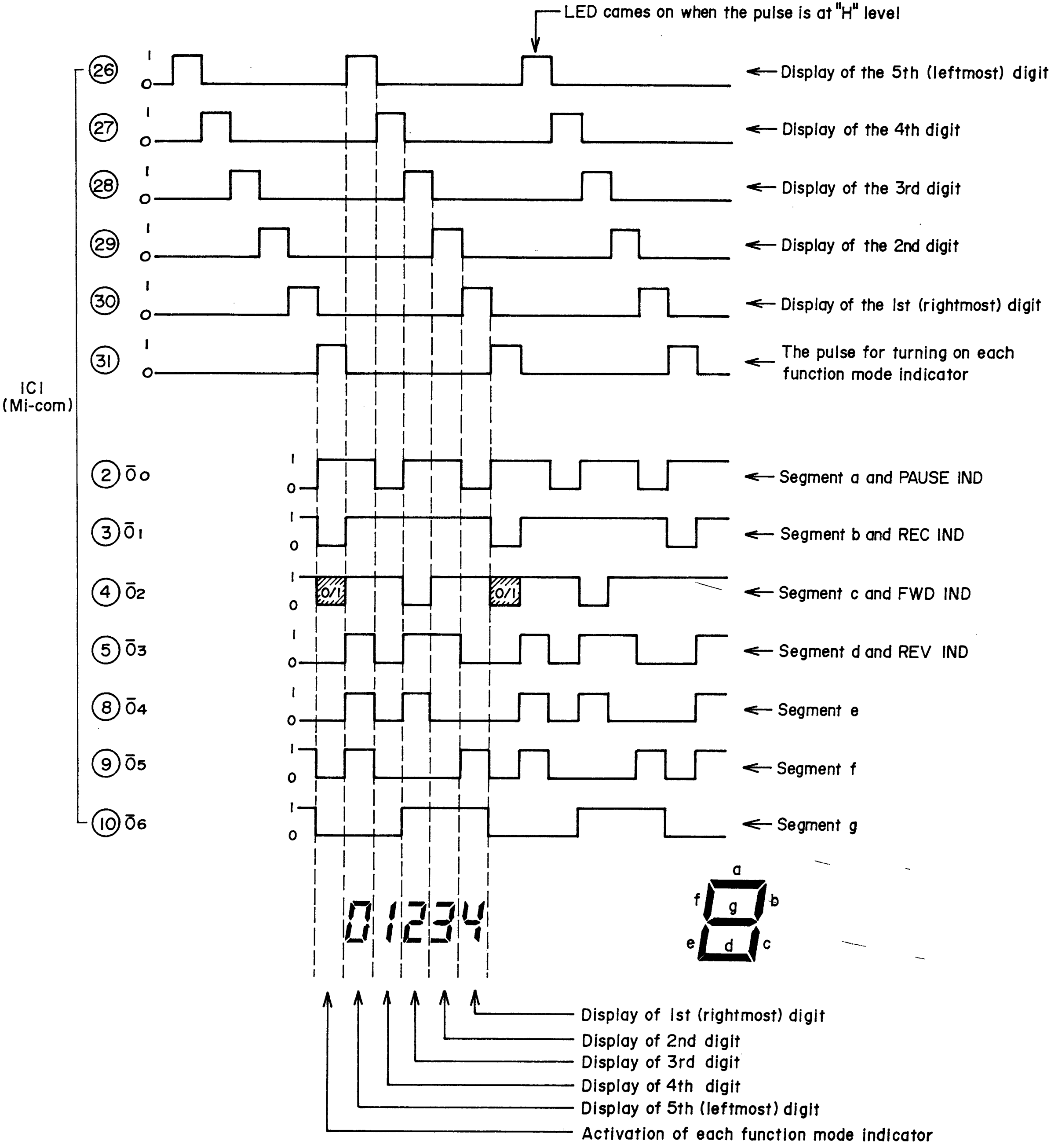

LED cames on when the pulse is at "H" level
IC1 (Mi-com)
㉖
㉗
㉘
㉙
㉚
㉛
② Ō0
③ Ō1
④ Ō2
⑤ Ō3
⑧ Ō4
⑨ Ō5
⑩ Ō6
1
0
0/1
Display of the 5th (leftmost) digit
Display of the 4th digit
Display of the 3rd digit
Display of the 2nd digit
Display of the 1st (rightmost) digit
The pulse for turning on each function mode indicator
Segment a and PAUSE IND
Segment b and REC IND
Segment c and FWD IND
Segment d and REV IND
Segment e
Segment f
Segment g
01234
a
b
c
d
e
f
g
Display of 1st (rightmost) digit
Display of 2nd digit
Display of 3rd digit
Display of 4th digit
Display of 5th (leftmost) digit
Activation of each function mode indicator

Fig. 6-37

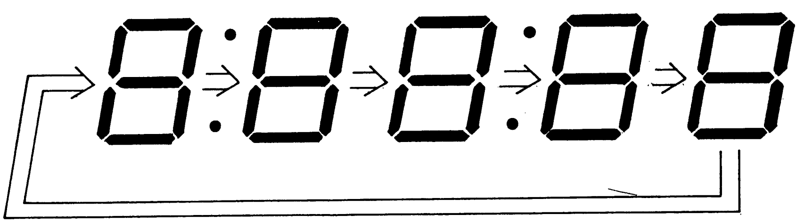


Fig. 6-38

tion of $\overline{O}0$ - $\overline{O}6$ of the first digit indication in Fig. 23, b, c, f, and g segments are lit and a, d and e segments are dark. In this condition, the indicator indicates 4. Similarly if we look at the 2nd - 5th digits, $\boxed{01234}$ is indicated in the condition of Fig. 6-37.

### 4-2-4 MICROCOMPUTER RESETTING CIRCUIT

(Refer to Fig. 6-39)

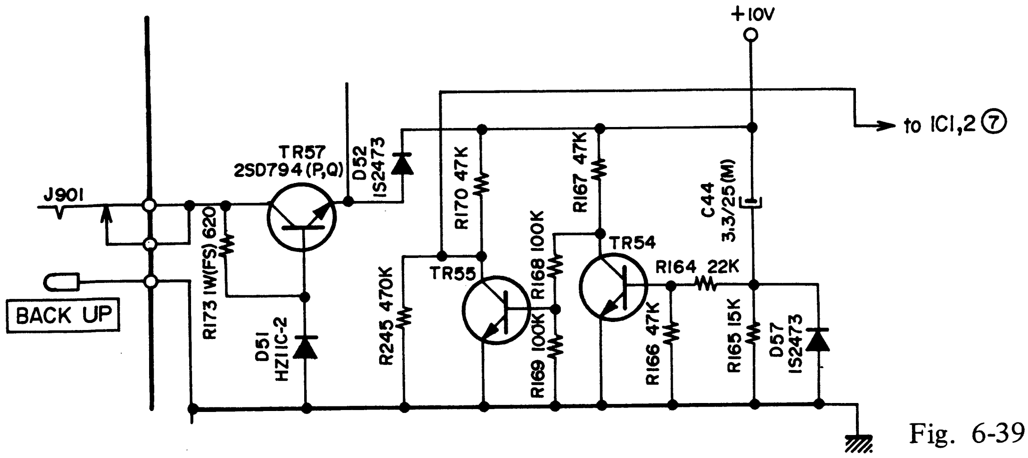

+10V
to IC1,2 ⑦
J901
BACK UP
TR57
2SD794(P,Q)
D52
1S2473
R173 1W(FS) 620
D51
HZ11C-2
R245 470K
R170 47K
TR55
R168 100K
R169 100K
R167 47K
TR54
R164 22K
R166 47K
C44
3.3/25(M)
R165 15K
D57
1S2473

Fig. 6-39

A reset circuit is provided in order to eliminate the memory of the electronic counter and 0 Stop when power is supplied.

When power is turned on, the voltage (+10V) is supplied to the base of TR54 through C44 and R164 to turn TR54 ON, i. e., the collector of TR54 will be "L" to turn TR55 OFF through R168 which means the collector of TR55 will be "H". Then "H" is supplied to Terminal ⑦ of IC1 and 2, and when Terminal ⑦ becomes "H", the microcomputer is reset. When the charging to C44 is completed, TR54 is turned OFF, TR55 ON and Terminal ⑦ "L".

### 4-2-5 TIMER STARTING CIRCUIT

(Refer to Fig. 6-40)

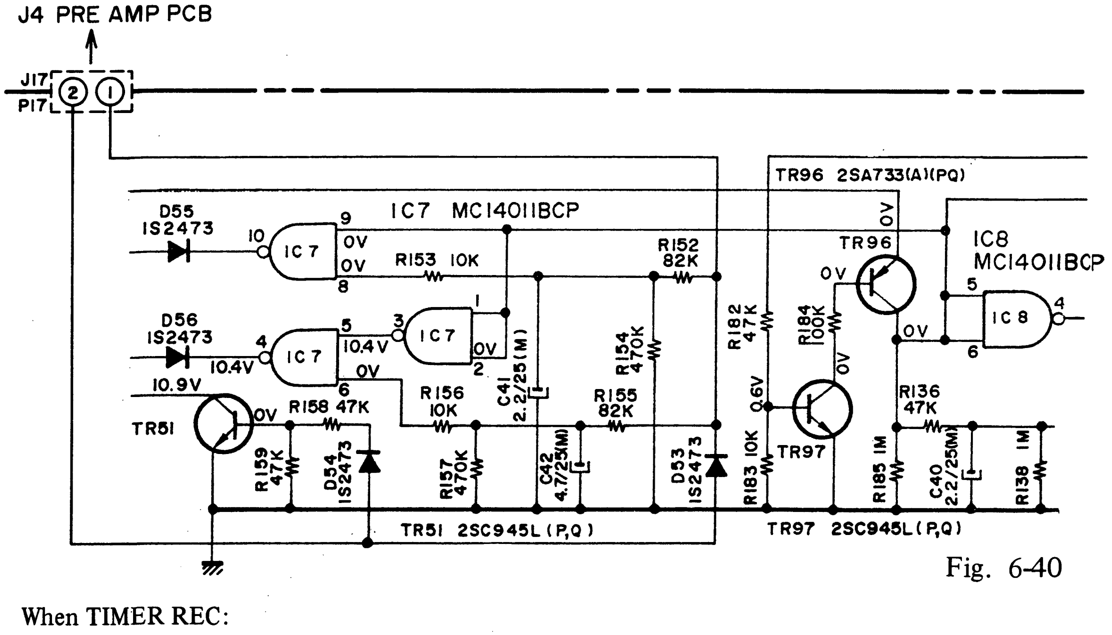

J4 PRE AMP PCB
J17
P17
②
①
TR96 2SA733(A)(PQ)
IC7 MC14011BCP
D55
1S2473
10
9
IC 7
0V
0V
8
R153 10K
R152
82K
0V
TR96
0V
IC8
MC14011BCP
5
4
IC 8
6
D56
1S2473
4
5
3
IC 7
1
10.4V
IC 7
0V
2
10.4V
0V
6
10.9V
TR51
0V
R158 47K
R156
10K
C41
2.2/25(M)
R154
470K
R155
82K
R182
47K
R184
100K
0V
0.6V
0V
R136
47K
R159
47K
D54
1S2473
R157
470K
C42
4.7/25(M)
D53
1S2473
R183 10K
TR97
R185 1M
C40
2.2/25(M)
R138 1M
TR51 2SC945L(P,Q)
TR97 2SC945L(P,Q)

Fig. 6-40

When TIMER REC:

When power is switched ON, the base of TR51 is turned "H" through C49 and R88 of the Pre Amplifier P.C Board and through D54 and R158 of J17 ② of the Syscon P.C Board. The collector becomes "L" to turn TR63 ON through R205. The "H" from J17 ② makes IC7 ⑥ "H" through D53, R155 and R156, and at the same time, "H" is supplied to IC7 ⑧ through D53, R152 and R153. Depending on the condition of the collector of TR96, the output to IC7 ⑩ or IC7 ④ is determined and the direction of FWD or REV is determined. If the collector of TR96 is "L", IC7 ③ becomes "H".

Therefore, "H" goes into IC7 ⑤ and ⑥, the IC7 ④ becomes "L".

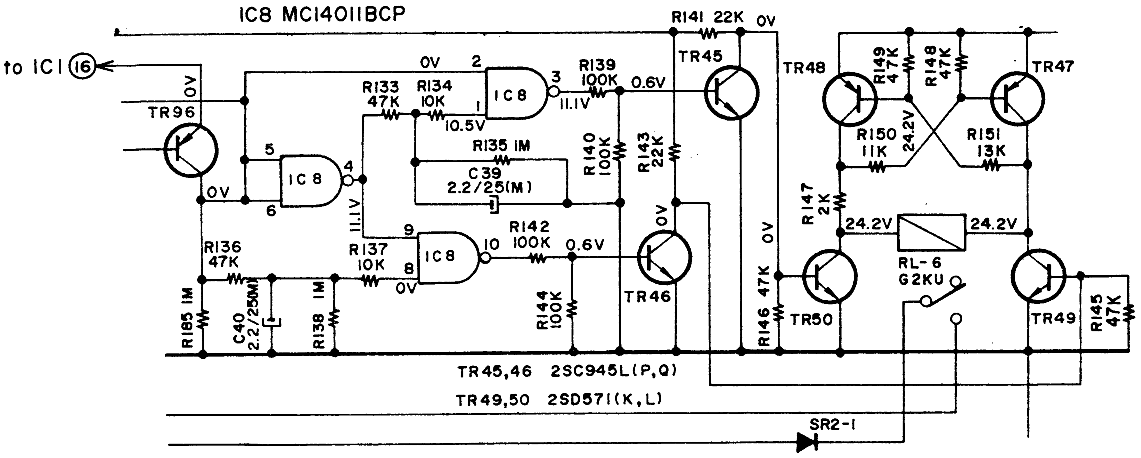
TR60 is energized through D56, i. e., FWD REC.

When TIMER PB:

Same as for REC TIMER START, but due to the lack of input in TR51, FWD or REV PB is achieved instead of REC.

## 6-2-6 REVERSE HOLDING CIRCUIT

(Refer to Fig. 6-41)



IC8 MC14011BCP
to IC1 ⑯
TR96
0V
0V
R133 47K
R134 10K
0V 2
1
IC8
3
R139 100K
0.6V
11.1V
10.5V
R135 1M
C39 2.2/25(M)
R140 100K
R143 22K
5
4
6
IC8
11.1V
9
R137 10K
8
IC8
10
R142 100K
0.6V
0V
0V
R136 47K
R185 1M
C40 2.2/25(M)
R138 1M
R144 100K
TR46
R141 22K
0V
TR45
TR48
R149 47K
R148 47K
TR47
24.2V
R150 11K
R151 13K
R147 2K
0V
24.2V
24.2V
RL-6 G2KU
R146 47K
TR50
TR49
R145 47K
TR45,46 2SC945L(P,Q)
TR49,50 2SD571(K,L)
SR2-1

Fig. 6-41

Suppose the REV key is pressed when the machine is in FWD mode. IC1 ⑯ becomes "H", and "H" is supplied to the emitter of TR96. Because the base of TR96 is always "L", the "H" of the emitter of TR96 will go to the collector of TR96. IC8 ⑤ and ⑥ become "H", IC8 ④ "L", and the "H" of TR96 collector is supplied to IC8 ⑧ through R136 and R137, and therefore, "H" to IC8 ⑩. This "H" is supplied to the base of TR46 through R142 to make the collector of TR46 "L". Consequently the base of TR49 is "L" and the collector of TR49 "H". Since IC8 ④ is "H" in FWD mode, C39 is charged. Therefore, IC8 ① is kept at "H" until C39 is discharged even if IC8 ④ becomes "L". Because IC8 ① and ② become "H", IC8 ③ "L". The base of TR45 becomes "L" through R139 and the collector "H", and TR50 is energized. "L" of the collector of TR50 turns TR47 ON through R147 and R150. Therefore, current runs to RL6 and TR50 through TR47, and RL6 is working. The RL6 relay worked remains in that position even when the power is turned OFF, and when the reverse voltage is applied, it is reset. When the TR6 is worked, the output from IC1 ㉘ is taken into IC1 ㊴ through the switch of RL6 and the direction is decided for REV mode by the microcomputer.

### 4-2-7 BRAKE CONTROL SYSTEM OF REEL MOTOR (Refer to Figs. 6-42 to 6-46)

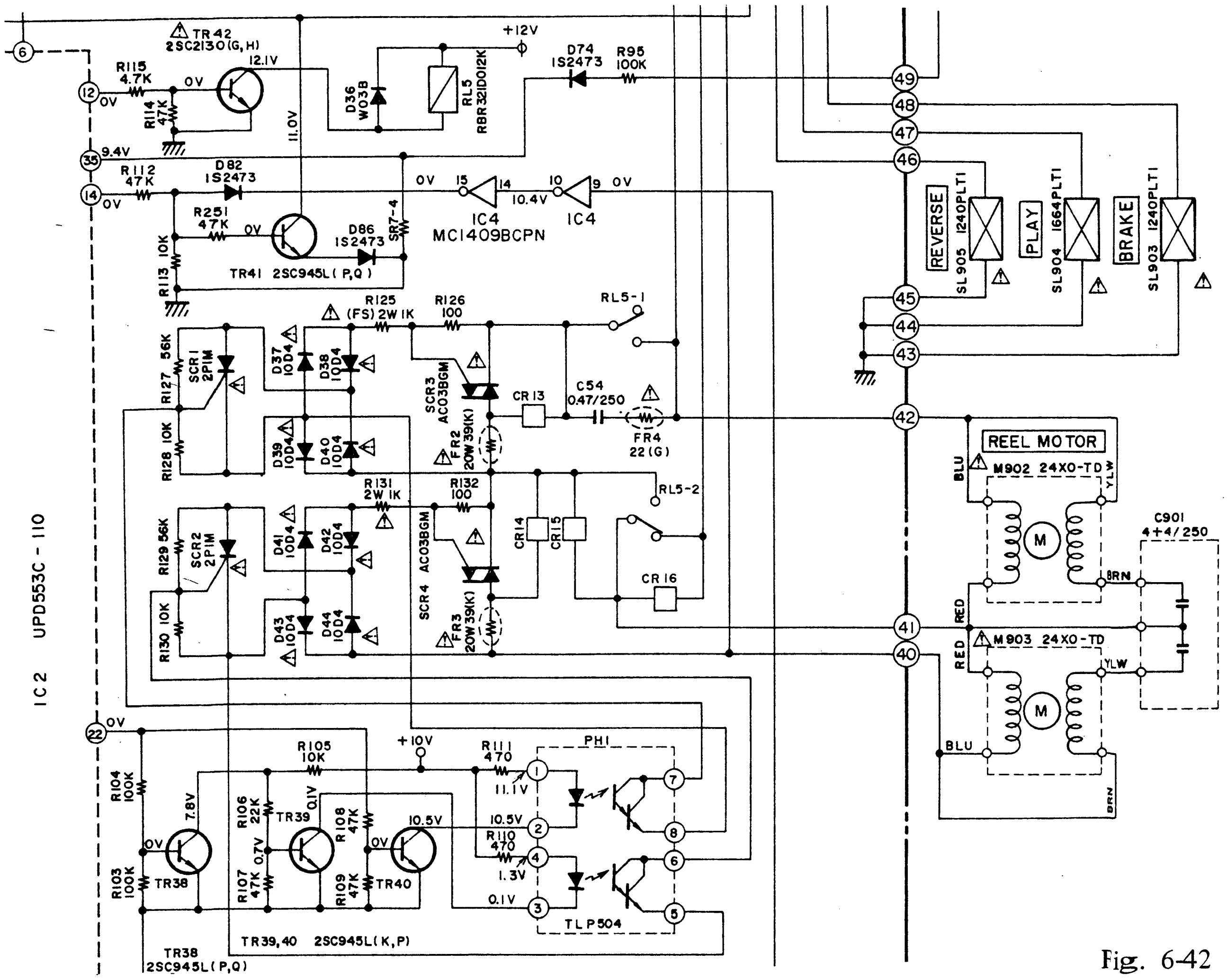

TR42 2SC2130(G,H)
+12V
12.1V
R115 4.7K
0V
R114 47K
11.0V
D36 W03B
RL5 RBR321D012K
D74 1S2473
R95 100K
9.4V
R112 47K
D82 1S2473
R251 47K
R113 10K
TR41 2SC945L(P,Q)
D86 1S2473
SR7-4
IC4 MC14098CPN
IC4
10.4V
R125 (FS) 2W 1K
R126 100
RL5-1
SCR1 2P1M
R127 56K
R128 10K
D37 10D4
D38 10D4
D39 10D4
D40 10D4
SCR3 AC03BGM
FR2 20W 39(K)
CR13
C54 0.47/250
FR4 22(G)
R131 2W 1K
R132 100
RL5-2
SCR2 2P1M
R129 56K
R130 10K
D41 10D4
D42 10D4
D43 10D4
D44 10D4
SCR4 AC03BGM
FR3 20W 39(K)
CR14
CR15
CR16
REVERSE
SL905 1240PLT1
PLAY
SL904 1664PLT1
BRAKE
SL903 1240PLT1
REEL MOTOR
M902 24XO-TD
M903 24XO-TD
BLU
YLW
BRN
RED
C901 4+4/250
IC2 UPD553C-110
R105 10K
+10V
R111 470
PH1
R104 100K
7.8V
R106 22K
TR39
0.1V
R108 47K
10.5V
R110 470
11.1V
1.3V
0.1V
R103 100K
TR38
R107 47K
0.7V
R109 47K
TR40
TLP504
TR38 2SC945L(P,Q)
TR39,40 2SC945L(K,P)

Fig. 6-42

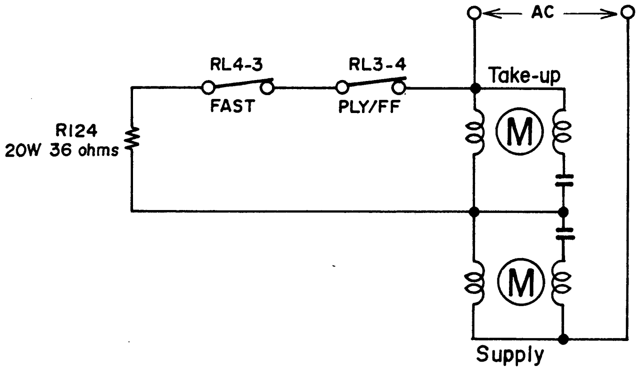

AC
RL4-3
FAST
RL3-4
PLY/FF
R124
20W 36 ohms
Take-up
M
M
Supply

Fig. 6-43

In the mode (Reel Size 7", 0 Stop SW ON), RWD SW is turned ON from a certain counter number, for example, 0:05:00.

Fig. 6-43 shows how the take up reel motor and the supply reel motor work. Since R124 36 ohms is connected in parallel to the take up reel motor, the torque of the supply reel motor is increased, and the tape is wound by the supply reel motor. If the counter indicates 0:00:50 from this position, "H" signal is issued from IC2 ⑫ (relay control).

"H" enters the base of TR42 through R115 to turn TR42 ON and RL5 ON. Fig. 6-44 shows the condition when RL5 is ON. R124 36 ohms so far attached is disconnected from the take up reel motor. Suppose the signal of IC2 ㉒ (reel motor control) is in "L". TR40 is OFF via R108, and TR38 is turned OFF via R104. TR38 collector will be "H". The base of TR49 will be "H" through R106 to turn TR39 ON, i, e., the switch of PH1-2 is ON.

Therefore, PH1-1 will be ON when PH1-2 is OFF or vice versa.

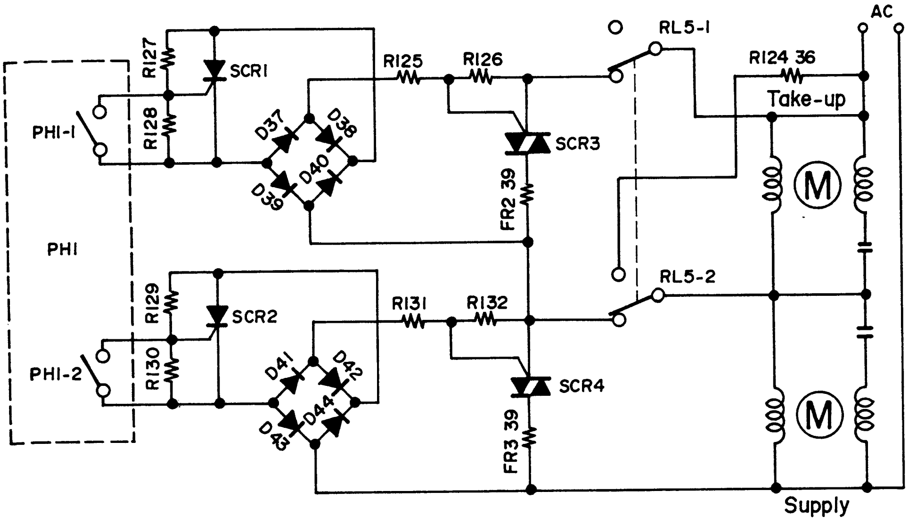

AC
RL5-1
R124 36
Take-up
R127
SCR1
R125
R126
PHI-1
R128
D37
D38
D40
D39
SCR3
FR2 39
PHI
RL5-2
R129
SCR2
R131
R132
PHI-2
R130
D41
D42
D44
D43
SCR4
FR3 39
Supply

Fig. 6-44

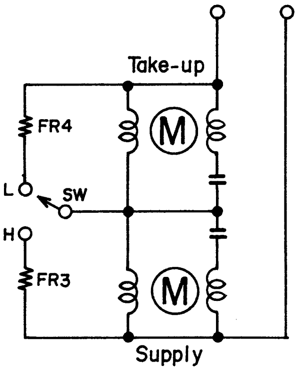

Take-up
FR4
L
SW
H
FR3
Supply

Fig. 6-45

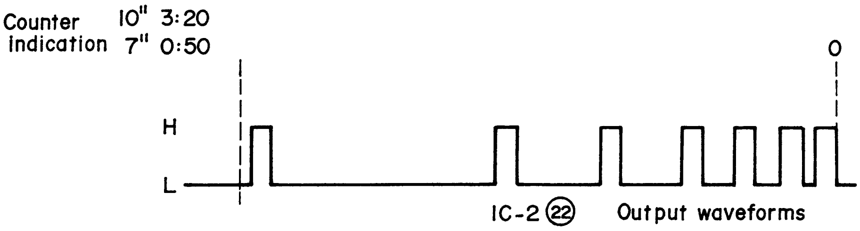


Fig. 6-46

When the switch of PH1-2 is ON, the gate of SCR2 becomes "L" and SCR2 is turned OFF. When SCR2 is OFF, no current will run to R132 and there will be no potential difference between the gate and the anode of SCR4 (triode AC switch), and therefore it will be OFF. On the other hand, since PH1-1 is OFF, SCR1 will be ON and SCR3 ON. This means that FR2 39 ohms, instead of R124 36 ohms, is connected in parallel to the take up reel motor and the RWD mode is maintained. Now, the signal of IC2 ㉒ is considered. IC2 ⑥ (interrupt) receives the signal (input to real time counter) from the Detecter P.C Board. The counter starts counting the input signal of ⑥ every 25 msec from 0:00:50. This data is compared with the data written in IC2 and when the reel motor is running at a speed faster than the data, "H" signal is issued to ㉒.

The switch in Fig. 6-45 goes to H side, the mode similar to FF is achieved and apparently the brake is applied.

Such waveform as shown in Fig. 6-46 appears at IC2 ㉒.

In such a way, the brake is applied on the motor to ensure that the motor stops at 0:00:00 of the counter. In the case of reel size 10", the microcomputer start working at the counter indication of 0:03:20. With the 0 Stop when the COUNT UP SW is ON, IC2 ㉒ usually becomes "H", and the negative pulse is issued.

# VII. MECHANISM ADJUSTMENT

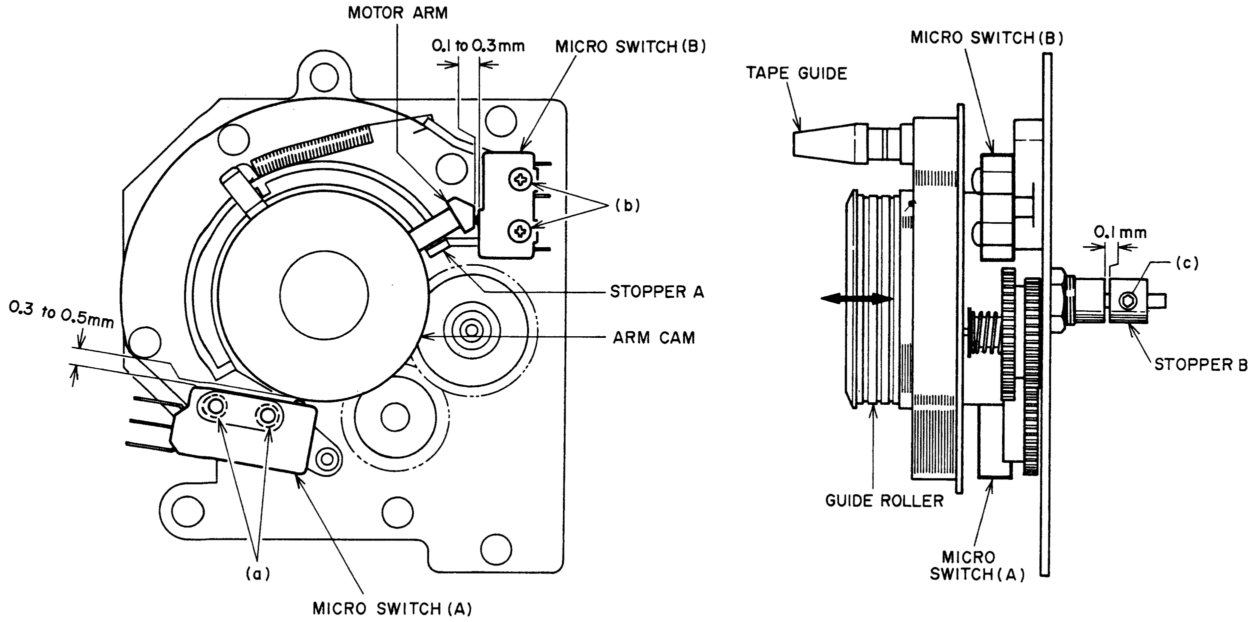

MOTOR ARM
0.1 to 0.3mm
MICRO SWITCH (B)
(b)
STOPPER A
ARM CAM
0.3 to 0.5mm
(a)
MICRO SWITCH (A)
MICRO SWITCH (B)
TAPE GUIDE
0.1 mm
(c)
STOPPER B
GUIDE ROLLER
MICRO SWITCH (A)

Fig. 7-1 Roller Block

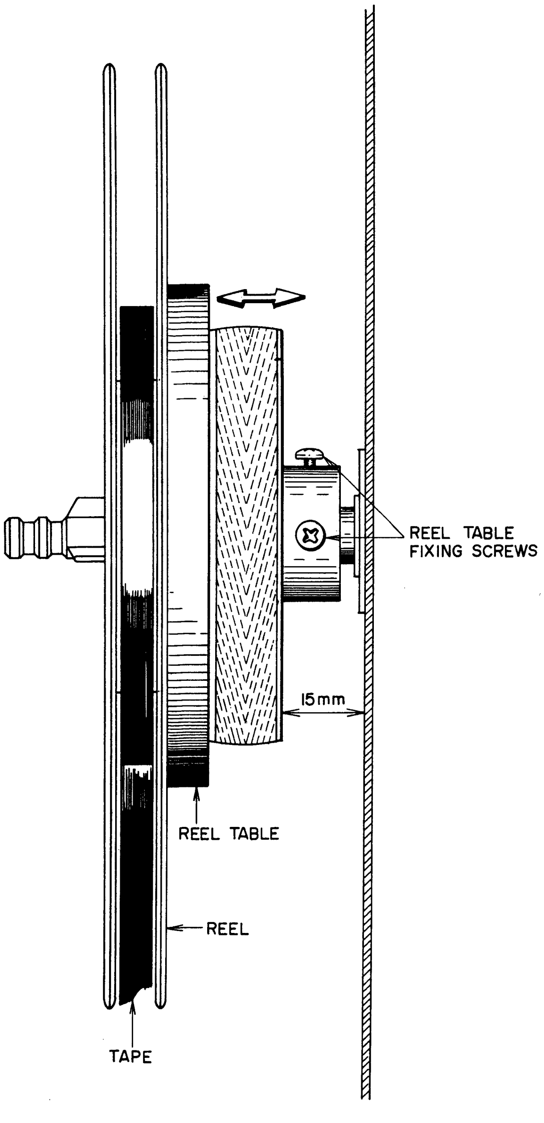

REEL TABLE FIXING SCREWS
15mm
REEL TABLE
REEL
TAPE

Fig. 7-2

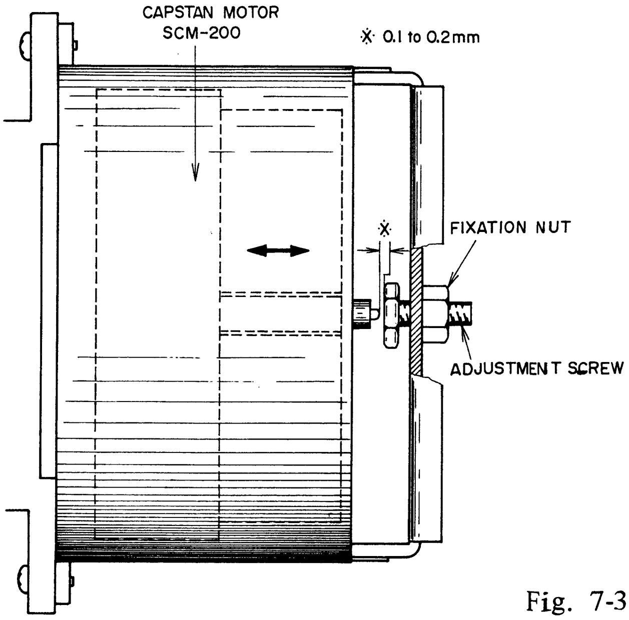

CAPSTAN MOTOR SCM-200
※ 0.1 to 0.2mm
※
FIXATION NUT
ADJUSTMENT SCREW

Fig. 7-3

## 1. GUIDE ROLLER LOOSE PLAY ADJUSTMENT (Refer to Fig. 7-1)

Adjust the stopper B (roller pulley on the right) screw (c) so that the loose play gap is approximately 0.1 mm when the guide roller is moved as indicated by arrow mark in Fig. 7-1.

## 2. MICRO SWITCH POSITION ADJUSTMENT (Refer to Fig. 7-1)

1) Micro Switch (A) Position Adjustment

Adjust the screw (a) so that the gap between the arm cam and the micro switch is approximately 0.3 to 0.5 mm. Check that the micro switch works and that the arm lock smoothly disengages.

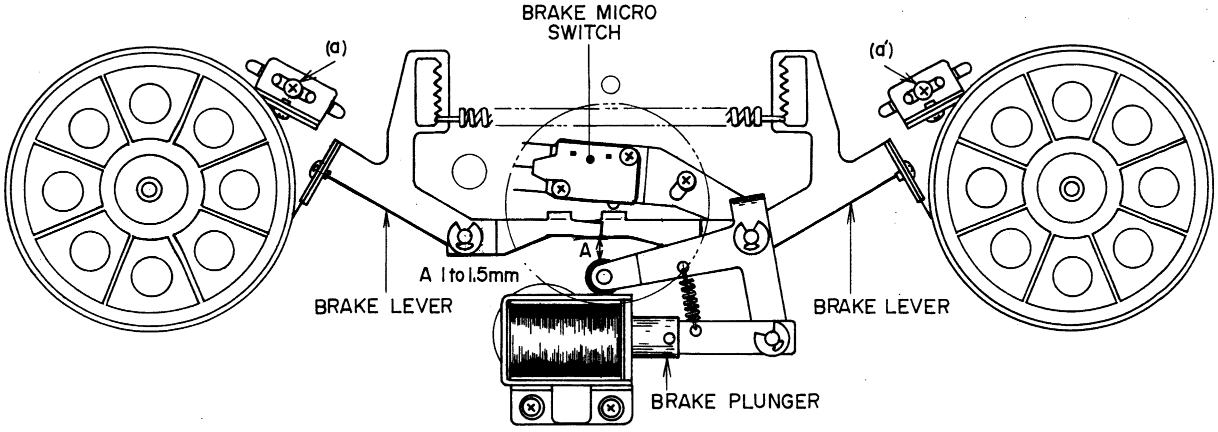


Fig. 7-4

2) Micro Switch (B) Position Adjustment
Rotate the arm cam, press the motor arm against the stopper A and then adjust so that the gap between the micro switch and the end of the motor arm is 0.1 to 0.3 mm.

NOTE: Steps 1 and 2 also apply to the right guide roller.

## 3. REEL TABLE HEIGHT ADJUSTMENT (Refer to Fig. 7-2)

1) Temporarily screw in the fixing screws leaving a gap of 15 mm between the reel table and the chassis board.
2) Run the tape and adjust the height of the reel table so that the tape is taken up in the center of the reel. Tighten fixing screws. Adjust the height of the right reel table at fast forward, of the left reel table at rewind.

## 4. CAPSTAN SHAFT LOOSE PLAY ADJUSTMENT (Refer to Fig. 7-3)

Adjust by turning Adjustment Screw to obtain a 0.1 to 0.2 mm degree of loose play when the capstan shaft is moved as indicated by the arrow mark.
Tighten fixation nut to maintain optimum adjusted condition.

## 5. BRAKE BAND POSITION ADJUSTMENT AND BRAKE TENSION ADJUSTMENT (Refer to Figs. 7-4 to 6)

1) Adjust the screws (a) and (a') so that the gap A between the brake lever and the rubber is 1 to 1.5 mm.
2) Work the brake plunger to check that the brake band is not slanted.
3) With the machine stopped, adjust the position of the spring so that a brake tension of 550 ~ 600 g is obtained on each brake.
4) By working the brake plunger with a finger, adjust the position of the micro switch screw (c) so that the gap between the brake lever and the micro switch body is 0.2 to 0.3 mm.

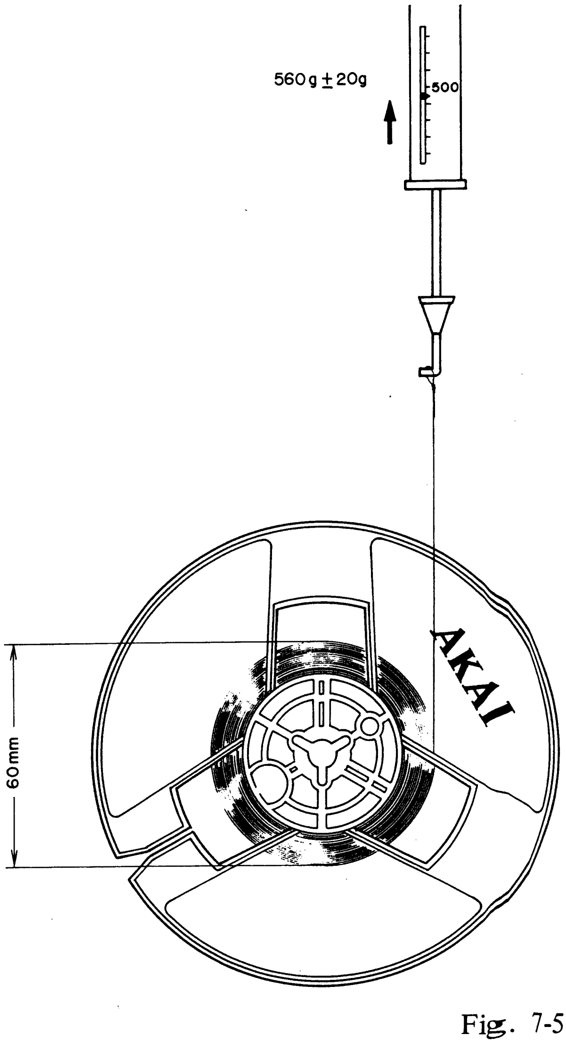


Fig. 7-5

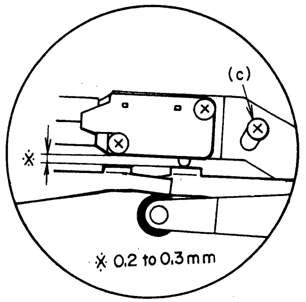


Fig. 7-6

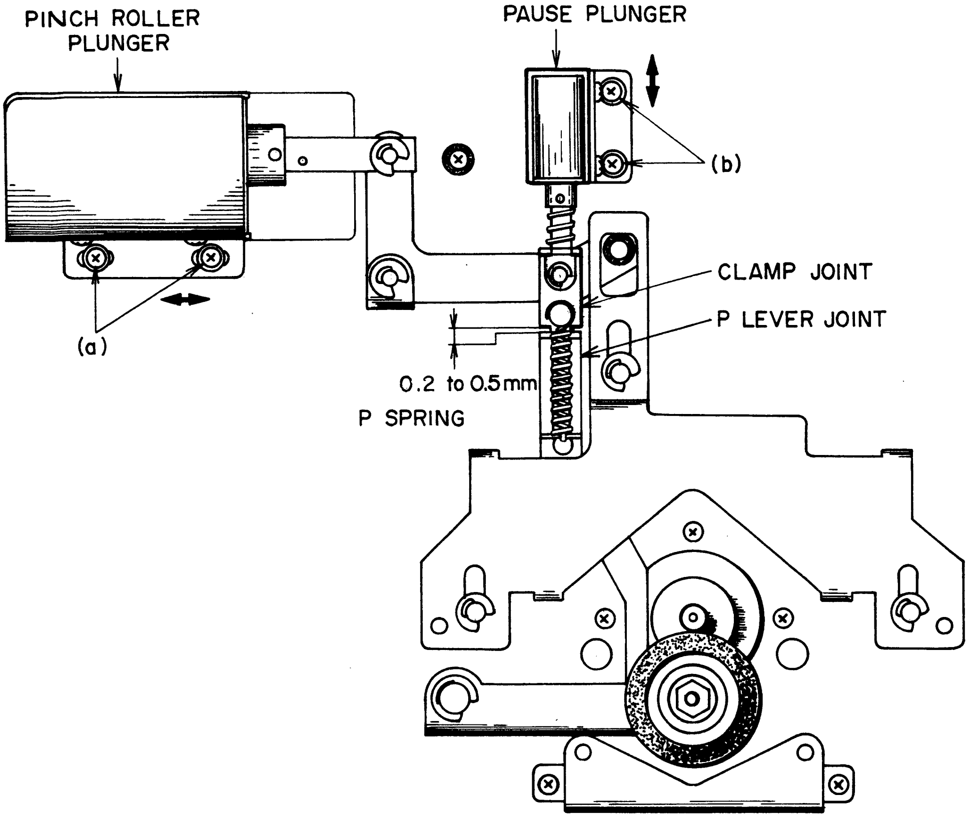

PINCH ROLLER PLUNGER
PAUSE PLUNGER
(b)
CLAMP JOINT
P LEVER JOINT
(a)
0.2 to 0.5mm
P SPRING

Fig. 7-7

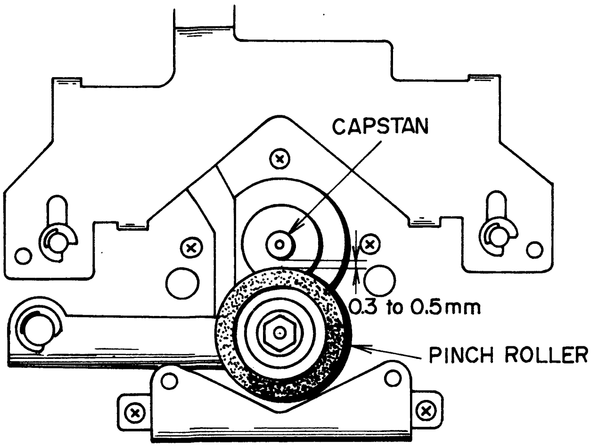

CAPSTAN
0.3 to 0.5mm
PINCH ROLLER

Fig. 7-8

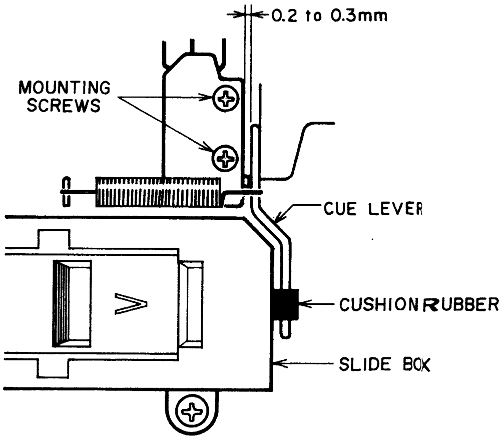

0.2 to 0.3mm
MOUNTING SCREWS
CUE LEVER
CUSHION RUBBER
SLIDE BOX

Fig. 7-9

## 6. PINCH ROLLER POSITION ADJUSTMENT (Refer to Fig. 7-7)

At the play mode, the gap between the clamp joint and the P lever joint should be 0.3 to 0.5 mm. Adjust the pinch roller plunger position with screws (a).

## 7. PAUSE PLUNGER POSITION ADJUSTMENT (Refer to Figs. 7-7, 7-8)

At the pause mode, the gap between the capstan and the pinch roller should be 0.2 to 0.5 mm. Adjust the pause plunger position with screws (b).

## 8. PINCH ROLLER PRESSURE ADJUSTMENT

Connect a 2 kg spring gauge to the pinch roller fixing screws. Pull down the pinch roller and then let it slowly move back. Check that the spring gauge reads 1.2 kg ± 200 g at the moment the pinch roller touches the capstan and starts rolling.

It is reads otherwise, replace the P spring (See Fig. 7-7).

## 9. CUE MICRO SWITCH POSITION ADJUSTMENT

By means of micro switch mounting screws, adjust the distance 'C' between the lever and the micro switch so as to be 0.2 to 0.3 mm with the cushion rubber in touch with the slide box. (See Fig. 7-9)

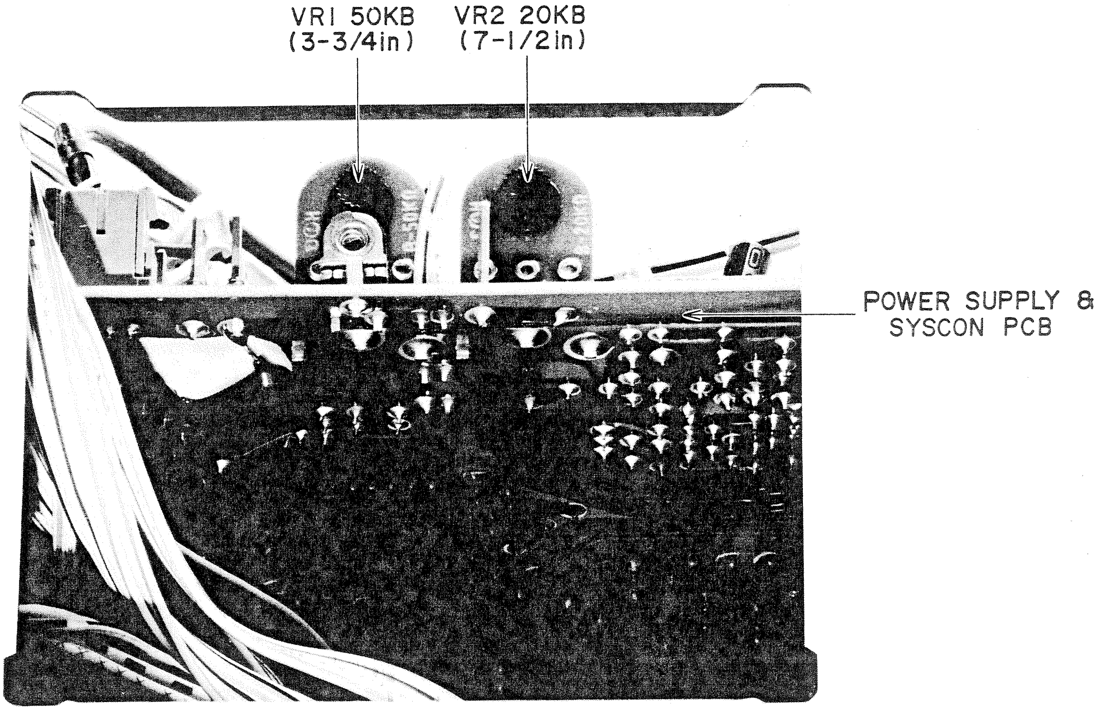

VR1 50KB
(3-3/4in)
VR2 20KB
(7-1/2in)
POWER SUPPLY &
SYSCON PCB

Fig. 7-10

## 10. TAPE SPEED ADJUSTMENT

(Refer to Fig. 7-10)

Set the Tape Speed Switch to 7-1/2 ips. and playback the 1,000 Hz, 7-1/2 Test Tape. Connect a frequency counter to LINE OUT and adjust VR2 20 kB until the counter reads, 1,000 Hz ± 0.8%. Next, set the Tape Speed Switch to 3-3/4 ips. and adjust VR1 50 kB until the frequency counter reads 500 Hz ± 1.0%.

# VIII. HEAD ADJUSTMENT

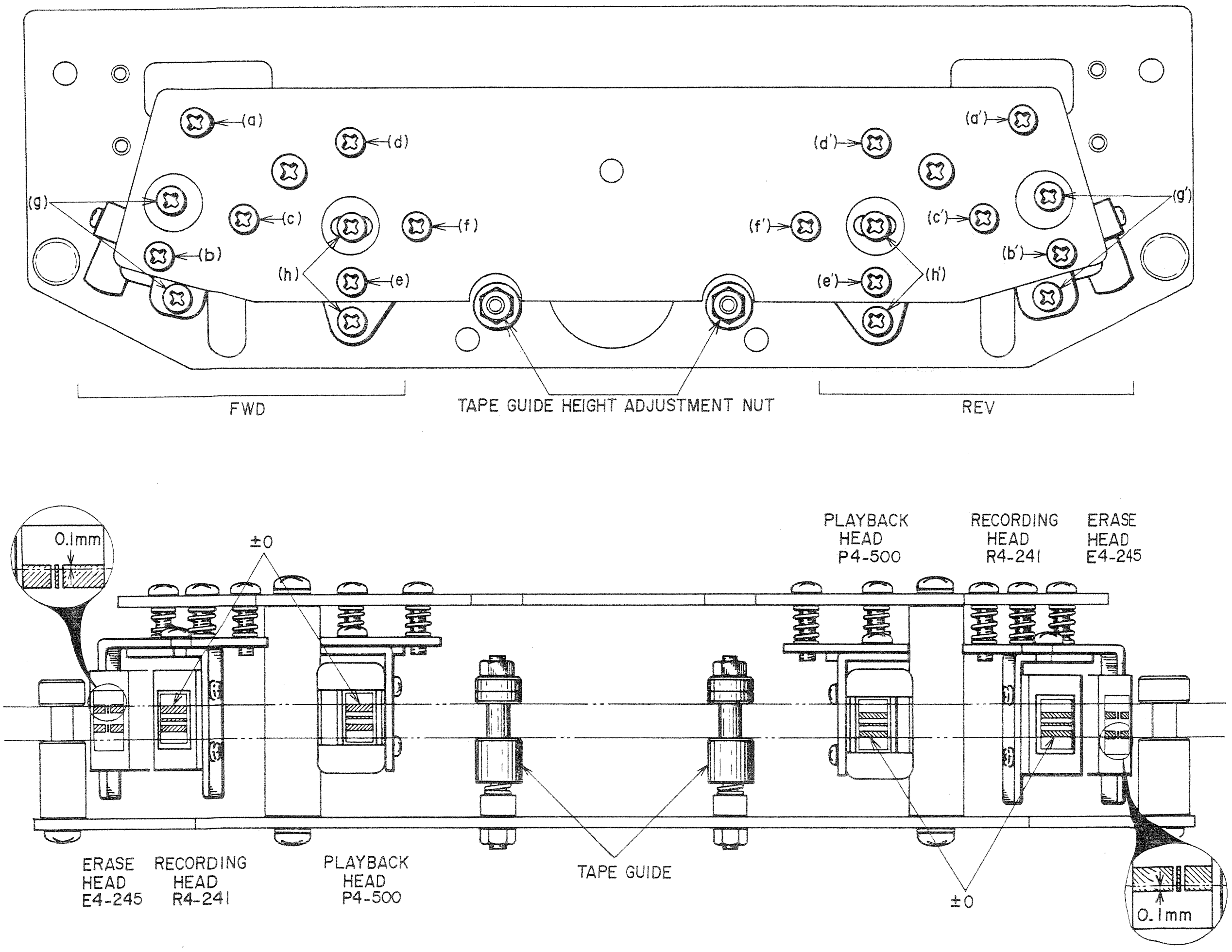

(a)
(d)
(c)
(f)
(g)
(b)
(h)
(e)
(a')
(d')
(c')
(f')
(g')
(b')
(h')
(e')
FWD
TAPE GUIDE HEIGHT ADJUSTMENT NUT
REV
0.1mm
±0
PLAYBACK HEAD P4-500
RECORDING HEAD R4-241
ERASE HEAD E4-245
ERASE HEAD E4-245
RECORDING HEAD R4-241
PLAYBACK HEAD P4-500
TAPE GUIDE
±0
0.1mm

Fig. 8-1

| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | REMARKS |
|---|---|---|---|---|---|
| 1 | Tape Guide Height | Optional | FWD | Tape Guide Height Adjustment Nut | 1) Adjust so that tape travels smoothly and does not twist.<br>2) Do not thread tape over tension arm. |
| 2 | FWD Recording Head Height | Optional | FWD | (a) (b) | Upper edges of Left Ch. head core and tape are the same height. |
| 3 | FWD Erase Head Height Confirmation | Optional | FWD | | Upper edge of Left Ch. head core is 0.1 mm higher than upper egde of tape |
| 4 | FWD Playback Head Height | Optional | FWD | (d) (e) | Upper edges of Left Ch. head core and tape are the same height. |
| 5 | FWD Playback Head Azimuth Alignment | 8,000 Hz<br>3-3/4 ips<br>Test Tape | FWD | (f) | Maximum output, both channels. |
| 6 | FWD Playback Head Angle Alignment | 8,000 Hz<br>3-3/4 ips<br>Test Tape | FWD | (h) | Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side. |
| 7 | FWD Recording Head Azimuth Alignment | Maxell UD<br>15,000 Hz<br>–20 dBm | REC | (c) | Maximum output, both channels. See NOTE 6. |
| 8 | FWD Recording Head Angle Alignment | Maxell UD<br>15,000 Hz<br>–20 dBm | REC | (g) | Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side. |

Fig. 8-2

NOTES:

1. As perfect head adjustments are vital to tape deck performance, be sure that these adjustments are carried out properly.
2. Be careful not to use a magnetized driver or other magnetized tools in the vicinity of the heads.
3. Use only new tape as level variation is likely to occur when using old tape.
4. Demagnetize heads with head demagnetizer before and after head adjustment.
5. Set tape speed to 7-1/2 ips.
6. Set Tape Selector Switch to NORMAL Position.
7. Adjustments outlined in Fig. 8-2 are only for FWD side heads. However, adjustments for REV side heads are exactly the same.

# IX. ELECTRICAL ADJUSTMENT

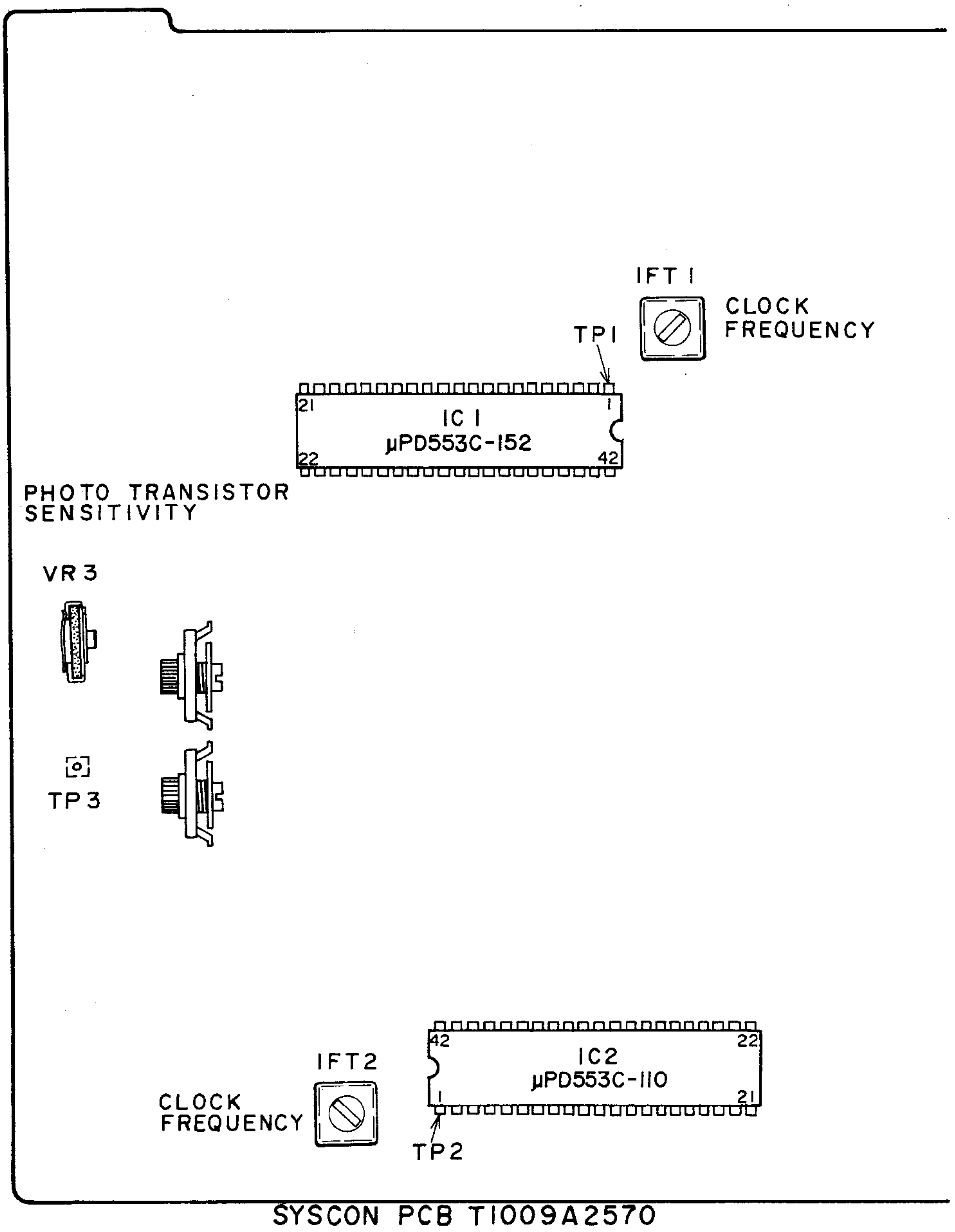

IFT 1
CLOCK FREQUENCY
TP1
IC 1
µPD553C-152
21
1
22
42
PHOTO TRANSISTOR SENSITIVITY
VR3
TP3
IFT2
CLOCK FREQUENCY
42
22
IC2
µPD553C-110
1
21
TP2
SYSCON PCB T1009A2570

Fig. 9-1 Syscon P.C Board T1009A2570

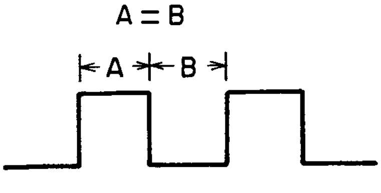


Fig. 9-2

## 1. CLOCK FREQUENCY ADJUSTMENT (Refer to Fig. 9-1)

Connect the frequency counter between TP1 (IC1 Pin ① ) and GND, and adjust with IFT1 so that the indicating values will be from 390 to 400 kHz.
Also for the IC2, make the same adjustment with IFT2.

## 2. PHOTO TRANSISTOR SENSITIVITY (Refer to Figs. 9-1, 9-2)

Connect the oscilloscope between TP3 and GND. For the reel size 10", adjust with VR3 so that the ON and OFF widths of the pulse will be equal (A=B) as shown in Fig. 9-2 when the rotation is stabilized in FF or REW mode.

## 3. PRE-AMPLIFIER P.C BOARD ADJUSTMENT

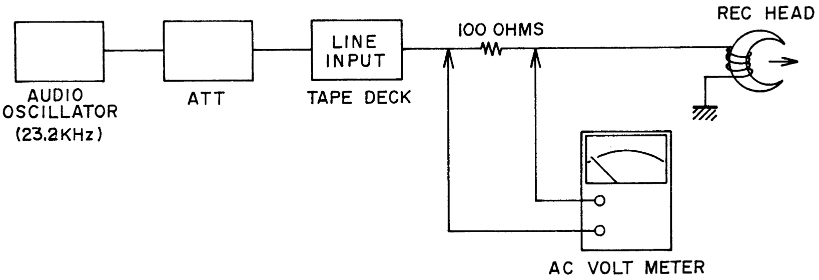

AUDIO OSCILLATOR (23.2KHz)
ATT
LINE INPUT
TAPE DECK
100 OHMS
REC HEAD
AC VOLT METER

Fig. 9-3 Rec Peaking Adjustment Instrument Connection (Step 3)

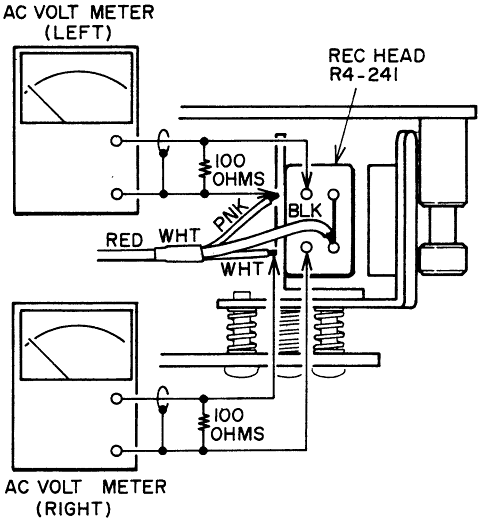

AC VOLT METER (LEFT)
REC HEAD R4-241
100 OHMS
PNK
BLK
RED
WHT
WHT
100 OHMS
AC VOLT METER (RIGHT)

Fig. 9-4 Rec Peaking Adjustment (Step 3)

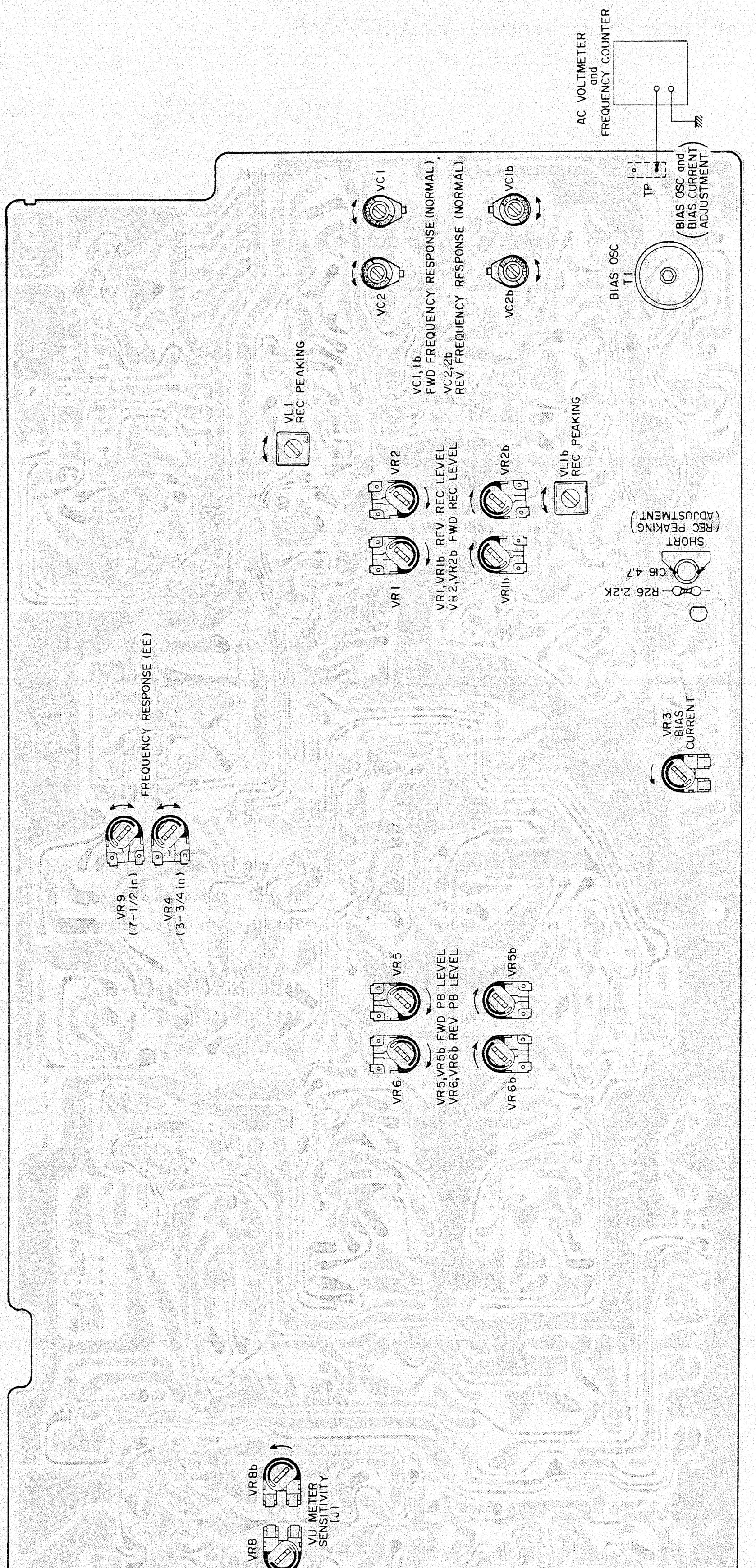

AC VOLTMETER and FREQUENCY COUNTER
TP
BIAS OSC and BIAS CURRENT ADJUSTMENT
BIAS OSC T1
VC1
VC2
VC1b
VC2b
VC1, 1b FWD FREQUENCY RESPONSE (NORMAL)
VC2, 2b REV FREQUENCY RESPONSE (NORMAL)
VL1 REC PEAKING
VL1b REC PEAKING
VR2
VR1
VR1,VR1b REV REC LEVEL
VR2,VR2b FWD REC LEVEL
VR2b
VR1b
SHORT (REC PEAKING ADJUSTMENT)
C16 4.7
R26 2.2K
VR3 BIAS CURRENT
FREQUENCY RESPONSE (EE)
VR9 (7-1/2 in)
VR4 (3-3/4 in)
VR5
VR6
VR5,VR5b FWD PB LEVEL
VR6,VR6b REV PB LEVEL
VR5b
VR6b
VR8
VR8b
VU METER SENSITIVITY (J)

Fig. 9-5 Pre Amp P.C Board T1015A5050

| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | RESULT | REMARKS |
|---|---|---|---|---|---|---|
| 1 | FWD Playback Level | 700 Hz 7-1/2 ips.<br>0 VU Test Tape | FWD | VR5 50 kB | –5.5±0.5 dBm<br>(410 mV) | |
| 2 | REV Playback Level | 700 Hz 7-1/2 ips.<br>0 VU Test Tape | REV | VR6 50 kB | –5.5±0.5 dBm<br>(410 mV) | |
| 3 | REC Peaking | 23.2 kHz from an Oscillator | REC | VL1 1 mH | Maximum AC Voltmeter indication | Set TAPE SELECTOR to "NORMAL"<br>Tape Speed 3-3/4 ips.<br>See NOTE 6, 7, 9 and Figs. 9-3, 9-4, 9-5. |
| 4 | BIAS OSC | | REC | T1 | 100 ± 0.5 kHz | Set TAPE SELECTOR to "NORMAL"<br>Tape Speed 7-1/2 ips.<br>Connect a Frequency Counter between TP and GND. Fig. 9-5. |
| 5 | BIAS Current | | REC | VR3 20 kB | 140±2 mV | Set TAPE SELECTOR to "NORMAL"<br>Tape Speed 7-1/2 ips.<br>Connect a AC Voltmeter between TP and GND Fig. 9-5. |
| 6 | FWD Recording Level | NORMAL Blank Tape 1,000 Hz –5.5 dBm Recording | FWD/ REC | VR2 20 kB | –5.5±0.5 dBm<br>(410 mV) | |
| 7 | REV Recording Level | NORMAL Blank Tape 1,000 Hz –5.5 dBm Recording | REV/ REC | VR1 20 kB | –5.5±0.5 dBm<br>(410 mV) | |
| 8 | Bias leak | No signal input Mic and Line Volume are MAX. | REC | FL1<br>(Mic Amp PCB) | Minimum | |
| 9 | NORMAL Position FWD Frequency Response | NORMAL Blank Tape 1.5 kHz, 15 kHz –25.5 dBm Recording | FWD/ REC | VC1 | 1.5 kHz, 15 kHz flat | Tape Speed 3-3/4 ips.<br>Recheck Recording Level. See NOTE 10. |
| 10 | NORMAL Position REV Frequency Response | NORMAL Blank Tape 1.5 kHz, 15 kHz –25.5 dBm Recording | REV/ REC | VC2 | 1.5 kHz, 15 kHz flat | Tape Speed 3-3/4 ips.<br>Recheck Recording Level. See NOTE 10. |
| 11 | EE Position Frequency Response (3-3/4 ips) | EE Blank Tape 1.5 kHz, 20 kHz –25.5 dBm Recording | FWD, REV/ REC | VR4 10 kB | 1.5 kHz, 20 kHz flat | Tape Speed 3-3/4 ips.<br>Recheck Recording Level. See NOTE 10. |
| 12 | EE Position Frequency Response (7-1/2 ips) | EE Blank Tape 1.5 kHz, 25 kHz –25.5 dBm Recording | FWD, REV/ REC | VR9 30 kB | 1.5 kHz, 25 kHz flat | Tape Speed 7-1/2 ips.<br>Recheck Recording Level. See NOTE 10. |
| 13 | FWD Distortion Confirmation | 1,000 Hz –5.5 dBm Recording | FWD/ REC | | NORMAL: Less than 0.5%<br>EE : Less than 0.4%<br>See NOTE 8. | |
| 14 | REC Distortion Confirmation | 1,000 Hz –5.5 dBm Recording | REV/ REC | | NORMAL: Less than 0.5%<br>EE : Less than 0.4%<br>See NOTE 8. | |

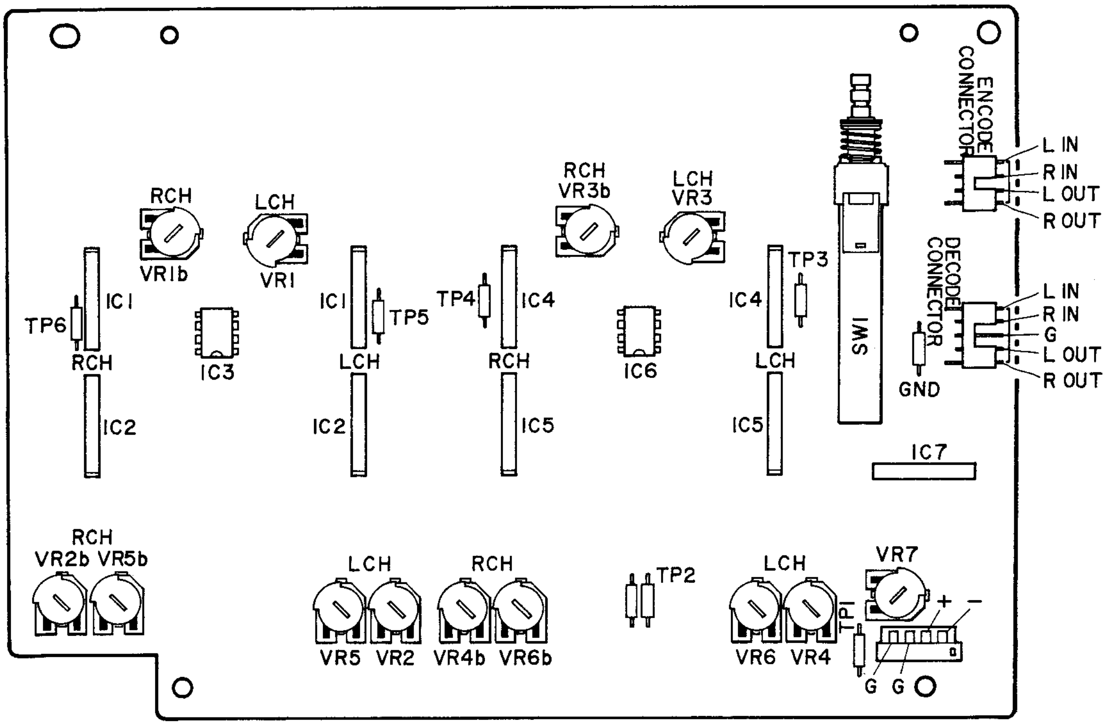
| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | RESULT | REMARKS |
|---|---|---|---|---|---|---|
| 15 | VU Meter Sensitivity | 1,000 Hz −5.5 dBm from an Oscillator | STOP | VR8 1 kB | 0 VU indication | Set MONITOR Switch to "SOURCE" |

NOTES:
1. Output Level Control should be at maximum.
2. Except for Steps 3, 8, 9 and 10, set Tape Speed to 7-1/2 ips.
3. Except for Steps 10 to 12 and 13, set Tape Selector Switch to NORMAL Position.
4. Set Bias Adjustment Volume to center position.
5. Use the following open measuring tapes:
   NORMAL Tape: Maxell UD
   EE Tape : Maxell XLII
   TDK SA
6. Stop Recording bias oscillator while making Rec Peaking adjustment (Refer to Fig. 9-4).
7. When 23.2 kHz indicates the peak, check and ensure that the AC Voltmeter show 16 dB of increase when 15 kHz of input is fed rather than when 1 kHz is fed.
8. If it does not comply with the specifications repeat Steps 6 to 10 and 11, and re-adjust.
9. Unless the core is moved intentionally this adjustment is not necessary.
10. Since the deviation is doubled if the dbx noise reduction system is actuated, when the frequency response is maladjusted and does not agree with the reference level, perform adjustments more exactly than so far been done.

## 4. dbx NR PC BOARD ADJUSTMENT

NOTICES

1. Adjustment of the dbx NR is not required except when a part is replaced or an adjustable VR is turned by mistake.
2. Since an error will be caused in the zero point level and detected time constant, when the dbx NR power supply voltage is not normal, be sure to adjust accurately.
3. Be specially cautious for the replacement of R22, R49 (22 M ohms), C17, and C33 (tantalum capacitor 10/25V).
   Since the values of R22 and R49 are as high as 22 Mohms, be cautious about dirt, flux, frost, etc. When C17 and C33 of small dielectric strength are used, misoperation can sometimes occur due to a change in leakage current.
4. In R.M.S symmetry adjustment (step 2), Observe the signals at the testpoints (TP 3 to TP 6) by refering to Fig. 9-8. Due to the signals at those testpoints are very low level.



RCH
LCH
VR1b
VR1
RCH
VR3b
LCH
VR3
ENCODE CONNECTOR
L IN
R IN
L OUT
R OUT
DECODE CONNECTOR
L IN
R IN
G
L OUT
R OUT
GND
TP6
IC1
RCH
IC2
IC3
IC1
TP5
LCH
IC2
TP4
IC4
RCH
IC5
IC6
IC4
TP3
LCH
IC5
SW1
IC7
RCH
VR2b VR5b
LCH
RCH
VR5 VR2 VR4b VR6b
TP2
LCH
VR7
VR6 VR4
TP1
+ −
G G O

VR1 ENCODER V.C.A SYMMETRY
VR2 ENCODER R.M.S SYMMETRY
VR3 DECODER V.C.A SYMMETRY
VR4 DECODER R.M.S SYMMETRY
VR5 ENCODER ZERO POINT
VR6 DECODER ZERO POINT
VR7 POWER SUPPLY

※ VR1b to VR6b IS INDICATE RIGHT CHANNEL

※ EACH TEST POINT IS USEING JUMPER RESISTER

Fig. 9-6 dbx Noise Reduction P.C. Board Adjustment point & Test point

| STEP | ADJUSTMENT ITEM | INPUT SIGNAL | TEST POINT | ADJUSTMENT POINT | RESULT | REMARKS |
|---|---|---|---|---|---|---|
| 1 | Power Supply | | TP1<br>TP2 | VR7 10KB | Adjust so that TP-1 output voltage becomes ±11.6±0.1V. At this time, make sure that TP-2 voltage is within −11.6±0.4V. | See Note 2. |

| STEP | ADJUSTMENT ITEM | INPUT SIGNAL | TEST POINT | ADJUSTMENT POINT | RESULT | REMARKS |
|---|---|---|---|---|---|---|
| 2 | R.M.S Symmetry | 100 Hz<br>–5.5 dBm<br>(410 mV) from an oscillator | TP-5 (L)<br>TP-6 (R)<br>(ENCODER)<br>TP-3 (L)<br>TP-4 (R)<br>(DECODER) | VR2 50kB<br>(ENCODER)<br>VR 450kB<br>(DECODER) | Observe TP3 to TP6 with an oscilloscope, and adjust with VR2 and VR4 (50 KB) so that the peak value of the waveform becomes constant at 200 Hz. | Refer to Fig. 9–7.<br>See Note 4.<br>Fig. 9-8 |
| 3 | V.C.A Symmetry | 1000 Hz,<br>–5.5 dBm<br>(410 mV) from an oscillator | Each ENCODER/ DECODER Output Terminal | VR1 50 kB<br>(ENCODER)<br>VR3 50 kB<br>(DECODER) | Adjust VR1 (encoder) and VR3 (decoder) so that the distortion at each terminal is minimized (below 0.1%). | |
| 4 | ZERO Point | 1000 Hz,<br>–5.5 dBm<br>(410 mV) from an oscillator | Each ENCODER/ DECODER Output Terminal | VR5 500 kB<br>(ENCODER)<br>VR6 500 kB<br>(DECODER) | Adjust VR5 (encoder) and VR6 (decoder) so that the output level of each output terminal corresponds to the input at –5.5 dBm (410 mV). | |
| 5 | Confirmation of ENCODER and DECODER Operation | 1000 Hz,<br>–5.5 dBm<br>±10 dB from an oscillator | Each ENCODER/ DECODER Output Terminal | Confirmation | Make sure that during encode and decode, compression and expansion are made in the proportion of 2 to 1, when the input signal level is changed by ±10 dB. (See Fig. 9-8) | Refer to Fig. 9–8. |

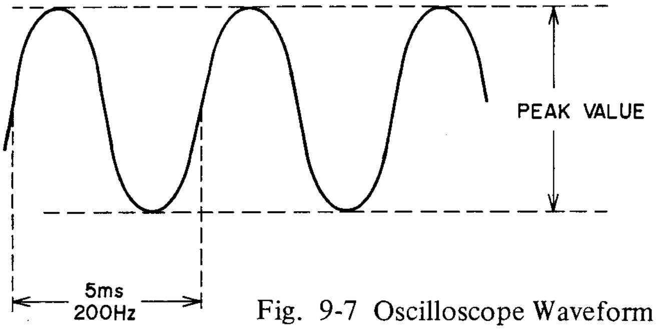


Fig. 9-7 Oscilloscope Waveform

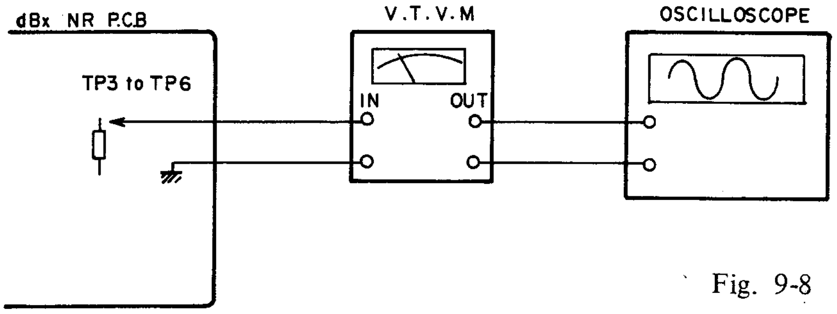


Fig. 9-8

| INPUT LEVELS | ENCODER OUTPUT LEVEL | DECODER OUTPUT LEVEL |
|---|---|---|
| –15.5 dBm | –10.5 dBm | –25.5 dBm |
| –5.5 dBm | –5.5 dBm | –5.5 dBm |
| +4.5 dBm | –0.5 dBm | +14.5 dBm |

* Tolerance of each output is ±3 dB.

Fig. 9-9

# X. DC RESISTANCE OF VARIOUS COILS

| PART | DESIGNATION | DC RESISTANCE |
|---|---|---|
| Main Motor | SCM-200 | Between BLU-RED: 110 ohms<br>Between YLW-BRN: 170 ohms<br>Pick-up Coil: 665 ohms |
| Reel Motor | 24X0-TD | Between BLU-RED: 30 ohms<br>Between YLW-BRN: 157 ohms |
| Pinch Roller Plunger | 1664PLT1 | 600 ohms ± 10% |
| Brake Plunger<br>REV Plunger | 1240PLT1 | 600 ohms ± 10% |
| Pause Plunger | 0730FLT | 600 ohms ± 10% |
| Relay | MY4-02-US-L | 650 ohms ± 15% |
| Relay | BR211 | 1,280 ohms ± 10% |
| Relay | G2KU | 1,000 ohms ± 10% |
| Relay | 321D012 | 230 ohms ± 15% |
| Erase Head | E4-245 | 3.1 ohms |
| Recording Head | R4-241 | 5.9 ohms |
| Playback Head | P4-500 | 407 ohms ± 5% |

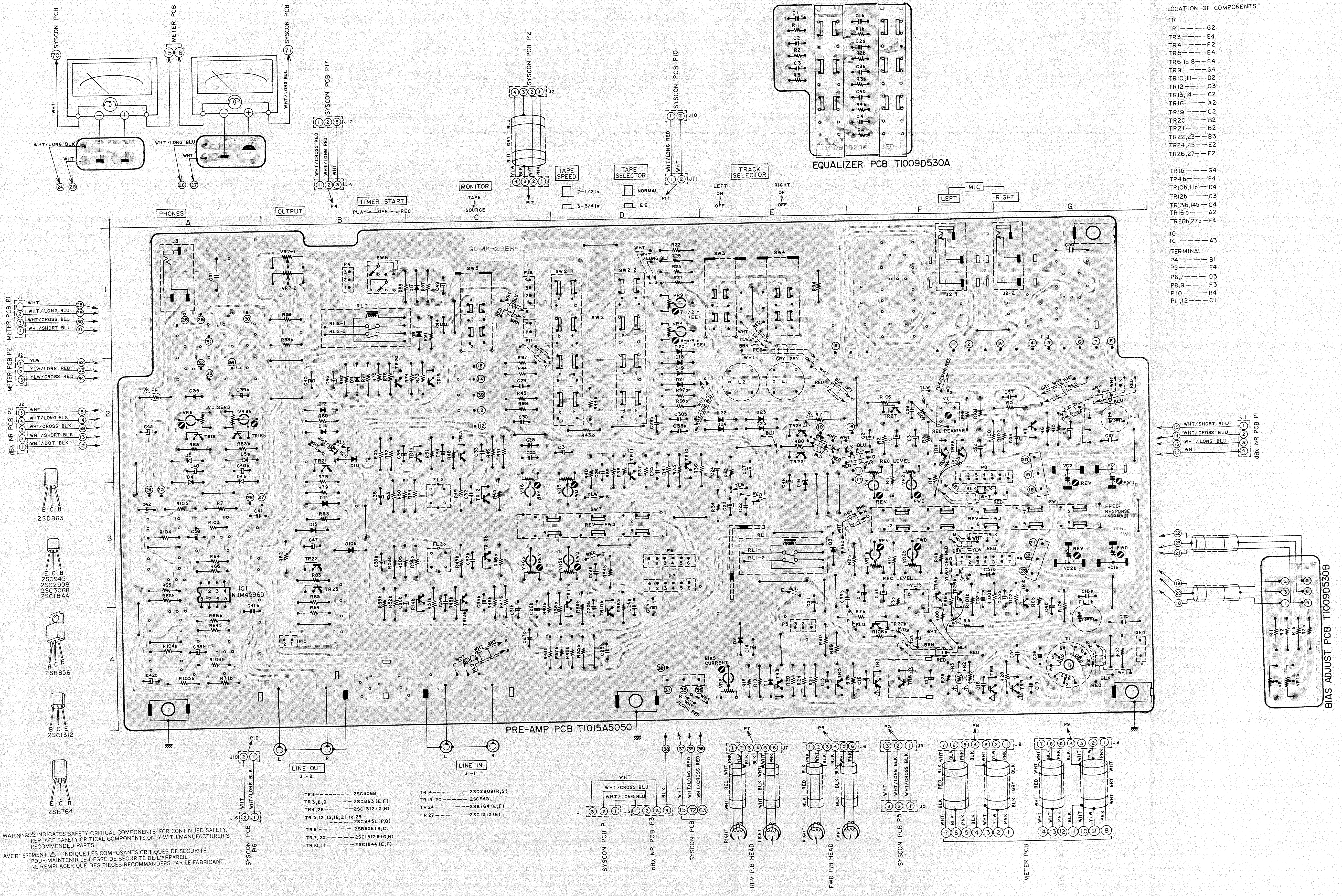
# XI. CLASSIFICATION OF VARIOUS P.C BOARDS

## 1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

| P.C BOARD TITLE | P.C BOARD NUMBER | REMARKS |
|---|---|---|
| Syscon P.C Board | T1009A2570 | |
| Pre Amp P.C Board | T1015A5050 | |
| Meter P.C Board | T1015D5030 | |
| Mic Amp P.C Board | T1015C5020 | |
| dbx NR P.C Board | T1015B5010 | |
| Operation P.C Board | T1009C2390 | |
| Fuse (A) P.C Board | T1009D2440 | |
| Fuse (B) P.C Board | T1009C2450 | |
| Counter P.C Board | T1009C2550 | |
| LED P.C Board | T1015D5040 | |
| Equalizer P.C Board | T1009D530A | |
| Bias, Adjustment P.C Board | T1009D530B | |
| Remocon P.C Board | T1009D2420 | |
| Switch P.C Board | T1009D2500 | |
| Detector (A) P.C Board | T1009D2540 | |
| Detector (B) P.C Board | T1009D2520 | |

## 2. COMPOSITION OF VARIOUS P.C BOARDS

### 1) Pre Amp P.C Board T1015A5050, Equalizer P.C Board T1009D530A and Bias Adjust P.C Board T1009D530B



SYSCON PCB
METER PCB
SYSCON PCB P17
SYSCON PCB P2
SYSCON PCB P10
EQUALIZER PCB T1009D530A
PHONES
OUTPUT
TIMER START
PLAY—OFF—REC
MONITOR
TAPE
SOURCE
TAPE SPEED
7-1/2 in
3-3/4 in
TAPE SELECTOR
NORMAL
EE
TRACK SELECTOR
LEFT ON OFF
RIGHT ON OFF
MIC
LEFT
RIGHT
A
B
C
D
E
F
G
1
2
3
4
METER PCB P1
METER PCB P2
dBx NR PCB P2
dBx NR PCB P1
WHT
WHT/LONG BLU
WHT/CROSS BLU
WHT/SHORT BLU
YLW
YLW/LONG RED
YLW/CROSS RED
WHT/LONG BLK
WHT/CROSS BLK
WHT/SHORT BLK
WHT/DOT BLK
2SD863
2SC945
2SC2909
2SC3068
2SC1844
2SB856
2SC1312
2SB764
E C B
B C E
IC1 NJM4596D
GCMK-29EHB
T1015A505A 2ED
AKAI
PRE-AMP PCB T1015A5050
BIAS CURRENT
REC LEVEL
REC PEAKING
FREQ RESPONSE (NORMAL)
REV
FWD
LINE OUT
J1-2
LINE IN
J1-1
L
R
SYSCON PCB P16
SYSCON PCB P1
dBx NR PCB P3
SYSCON PCB
REV P.B HEAD
FWD P.B HEAD
SYSCON PCB P5
METER PCB
BIAS ADJUST PCB T1009D530B

TR1 ---------- 2SC3068
TR3,8,9 ------ 2SC863 (E,F)
TR4,26 ------- 2SC1312 (G,H)
TR5,12,13,16,21 to 23 ------ 2SC945L (P,Q)
TR6 -------- 2SB856 (B,C)
TR7,25 ------- 2SC1312R (G,H)
TR10,11 ------- 2SC1844 (E,F)

TR14 --------- 2SC2909 (R,S)
TR19,20 ------ 2SC945L
TR24 ---------- 2SB764 (E,F)
TR27 ---------- 2SC1312 (G)

WARNING: ⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDEES PAR LE FABRICANT

LOCATION OF COMPONENTS

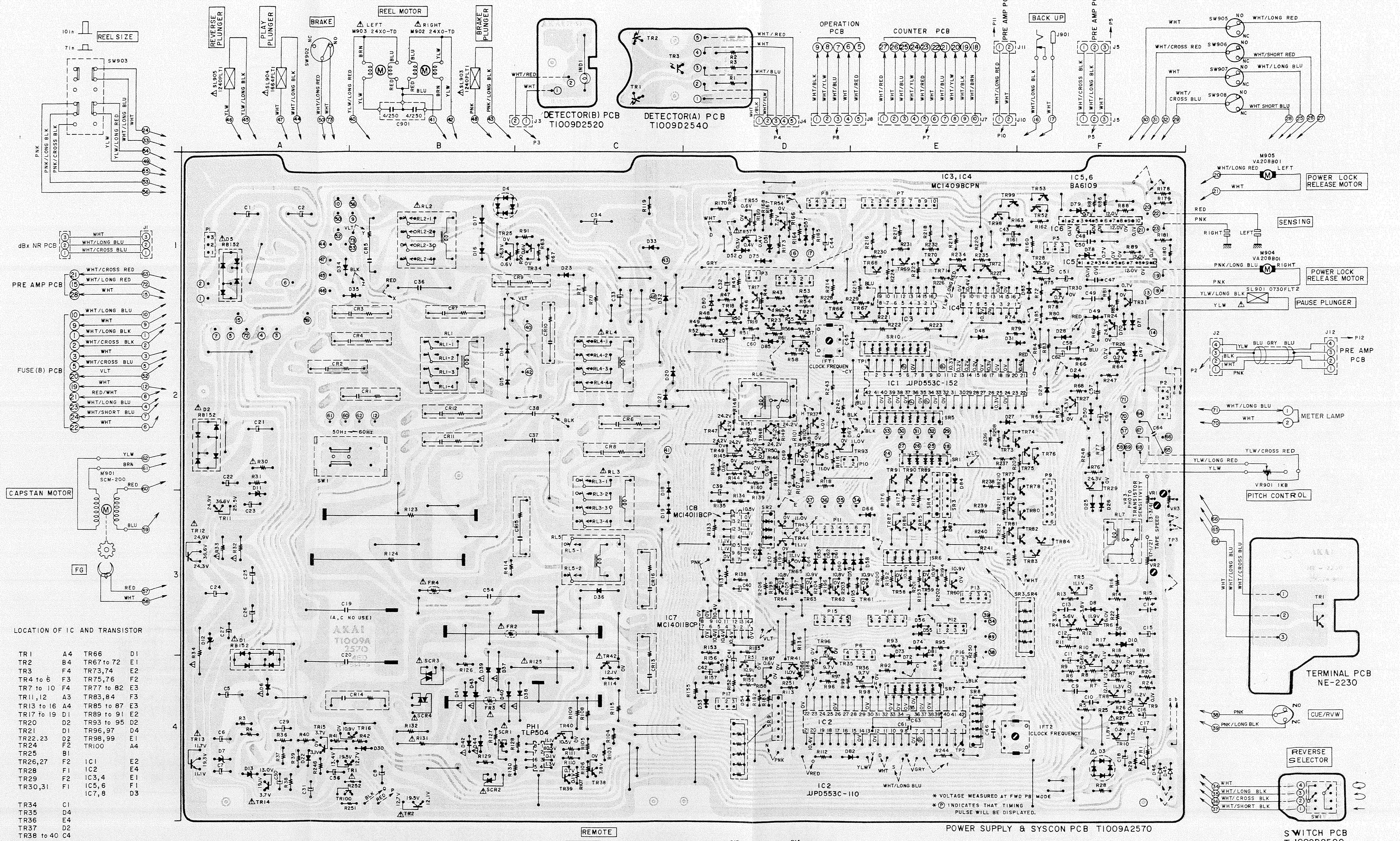
TR
TR1 ---- G2
TR3 ---- E4
TR4 ---- F2
TR5 ---- E4
TR6 to 8 -- F4
TR9 ---- G4
TR10,11 --- D2
TR12 ---- C3
TR13,14 -- C2
TR16 --- A2
TR19 --- C2
TR20 --- B2
TR21 --- B2
TR22,23 -- B3
TR24,25 -- E2
TR26,27 -- F2

TR1b --- G4
TR4b --- F4
TR10b,11b — D4
TR12b --- C3
TR13b,14b — C4
TR16b --- A2
TR26b,27b — F4

IC
IC1 ---- A3

TERMINAL
P4 ---- B1
P5 ---- E4
P6,7 --- D3
P8,9 --- F3
P10 --- B4
P11,12 --- C1

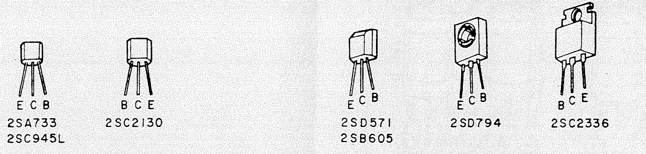
## 2) Power Supply & Syscon P.C Board T1009A2570 (4ED), Detector (A) P.C Board T1009D2540, Detector (B) P.C Board T1009D2520, Switch P.C Board T1009D2500, Terminal P.C Board NE2230 and Remocon P.C Board T1009D2420



REEL SIZE
SW903
REVERSE PLUNGER
SL905 1240FLT1
PLAY PLUNGER
SL904 1240FLT1
BRAKE
SW902
REEL MOTOR
LEFT M903 24X0-TD
RIGHT M902 24X0-TD
C901
BRAKE PLUNGER
SL903 1240FLT1
DETECTOR(B) PCB T1009D2520
DETECTOR(A) PCB T1009D2540
OPERATION PCB
COUNTER PCB
PRE AMP PCB
BACK UP
J901
dBx NR PCB
PRE AMP PCB
FUSE(B) PCB
CAPSTAN MOTOR
M901 SCM-200
FG
A
B
C
D
E
F
1
2
3
4
IC3,IC4 MC14098CPN
IC5,6 BA6109
IC1 μPD553C-152
IC2 μPD553C-110
IC7 MC14011BCP
IC8 MC14011BCP
PH1 TLP504
IFT1 CLOCK FREQUENCY
IFT2 CLOCK FREQUENCY
C19 (A.C NO USE)
AXAI T1009A 2570
* VOLTAGE MEASURED AT FWD PB MODE
* Ⓟ INDICATES THAT TIMING PULSE WILL BE DISPLAYED.
POWER SUPPLY & SYSCON PCB T1009A2570
M905 VA208801
POWER LOCK RELEASE MOTOR
SENSING
M904 VA208801
POWER LOCK RELEASE MOTOR
SL901 0730FLT2
PAUSE PLUNGER
PRE AMP PCB
METER LAMP
VR901 1KB
PITCH CONTROL
TERMINAL PCB NE-2230
CUE/RVW
REVERSE SELECTOR
SWITCH PCB T1009D2500
SW1

LOCATION OF IC AND TRANSISTOR

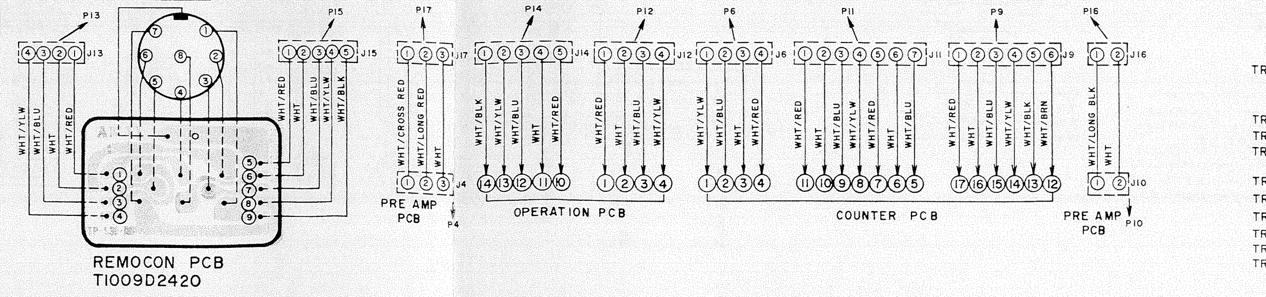
| | | | |
|---|---|---|---|
| TR1 | A4 | TR66 | D1 |
| TR2 | B4 | TR67 to 72 | E1 |
| TR3 | F4 | TR73,74 | E2 |
| TR4 to 6 | F3 | TR75,76 | F2 |
| TR7 to 10 | F4 | TR77 to 82 | E3 |
| TR11,12 | A3 | TR83,84 | F3 |
| TR13 to 16 | A4 | TR85 to 87 | E3 |
| TR17 to 19 | D1 | TR89 to 91 | E2 |
| TR20 | D2 | TR93 to 95 | D2 |
| TR21 | D1 | TR96,97 | D4 |
| TR22.23 | D2 | TR98,99 | E1 |
| TR24 | F2 | TR100 | A4 |
| TR25 | B1 | | |
| TR26,27 | F2 | IC1 | E2 |
| TR28 | F1 | IC2 | E4 |
| TR29 | F2 | IC3,4 | E1 |
| TR30,31 | F1 | IC5,6 | F1 |
| | | IC7,8 | D3 |
| TR34 | C1 | | |
| TR35 | D4 | | |
| TR36 | E4 | | |
| TR37 | D2 | | |
| TR38 to 40 | C4 | | |
| TR41 | D4 | | |
| TR42 | C4 | | |
| TR43,44 | D3 | | |
| TR45 to 50 | D2 | | |
| TR51 | D4 | | |
| TR52,53 | F1 | | |
| TR54,55 | D1 | | |
| TR57 | D1 | | |
| TR58 to 61 | E3 | | |
| TR62 to 65 | D3 | | |



E C B
2SA733
2SC945L
B C E
2SC2130
E C B
2SD571
2SB605
E C B
2SD794
B C E
2SC2336

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

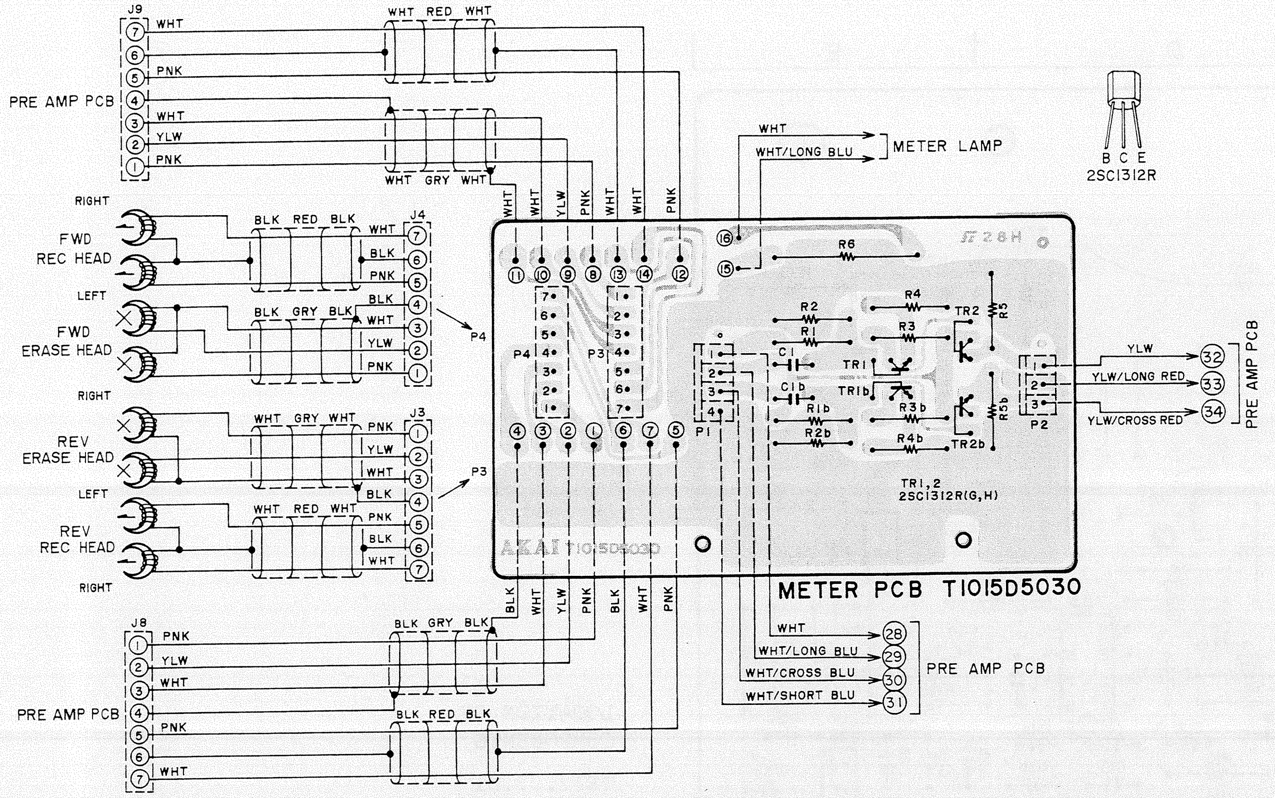
AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT



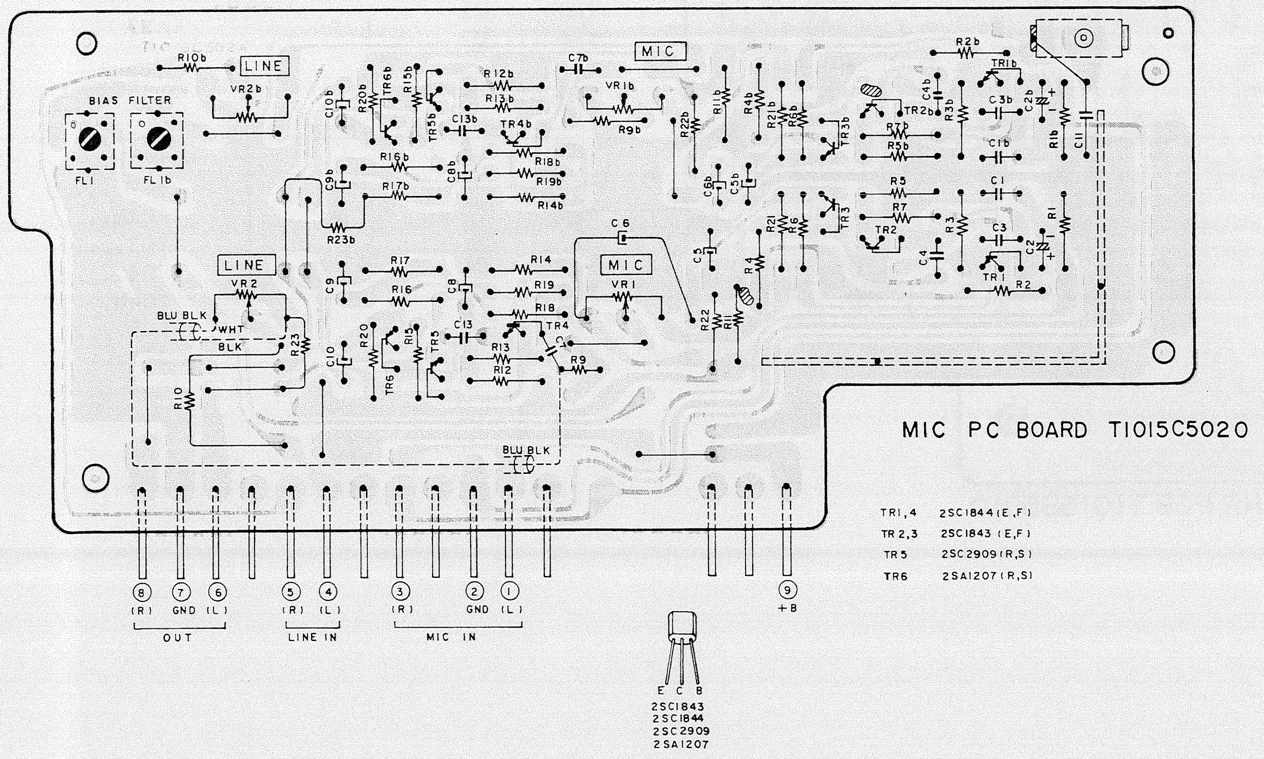
REMOTE
P13
J13
P15
J15
REMOCON PCB T1009D2420
P17
J17
PRE AMP PCB
P4
P14
J14
P12
J12
OPERATION PCB
P6
J6
P11
J11
P9
J9
COUNTER PCB
P16
J16
PRE AMP PCB
P10

| | |
|---|---|
| TR1, 3 to 6, 9, 11, 14, 16 to 22<br>35 to 38, 41, 45, 46, 51, 52, 54, 55<br>73, 74, 75 to 84, 89 to 91, 97, 98 | 2SC945L(P,Q) |
| TR23 | 2SC945L(Q) |
| TR39, 40, 66 to 72 | 2SC945L(K,P) |
| TR7, 8, 10, 15, 43, 44, 58 to 65<br>85 to 87, 93 to 96 | 2SA733A(P,Q) |
| TR2, 12, 13 | 2SC1061(B,C) |
| TR24 to 27, 34, 53, 99, 100 | 2SC2130(H) |
| TR28 to 31, 42 | 2SC2130(G,H) |
| TR47, 47 | 2SB605(K,L) |
| TR49, 50 | 2SD571(K,L) |
| TR57 | 2SD794(P,Q) |

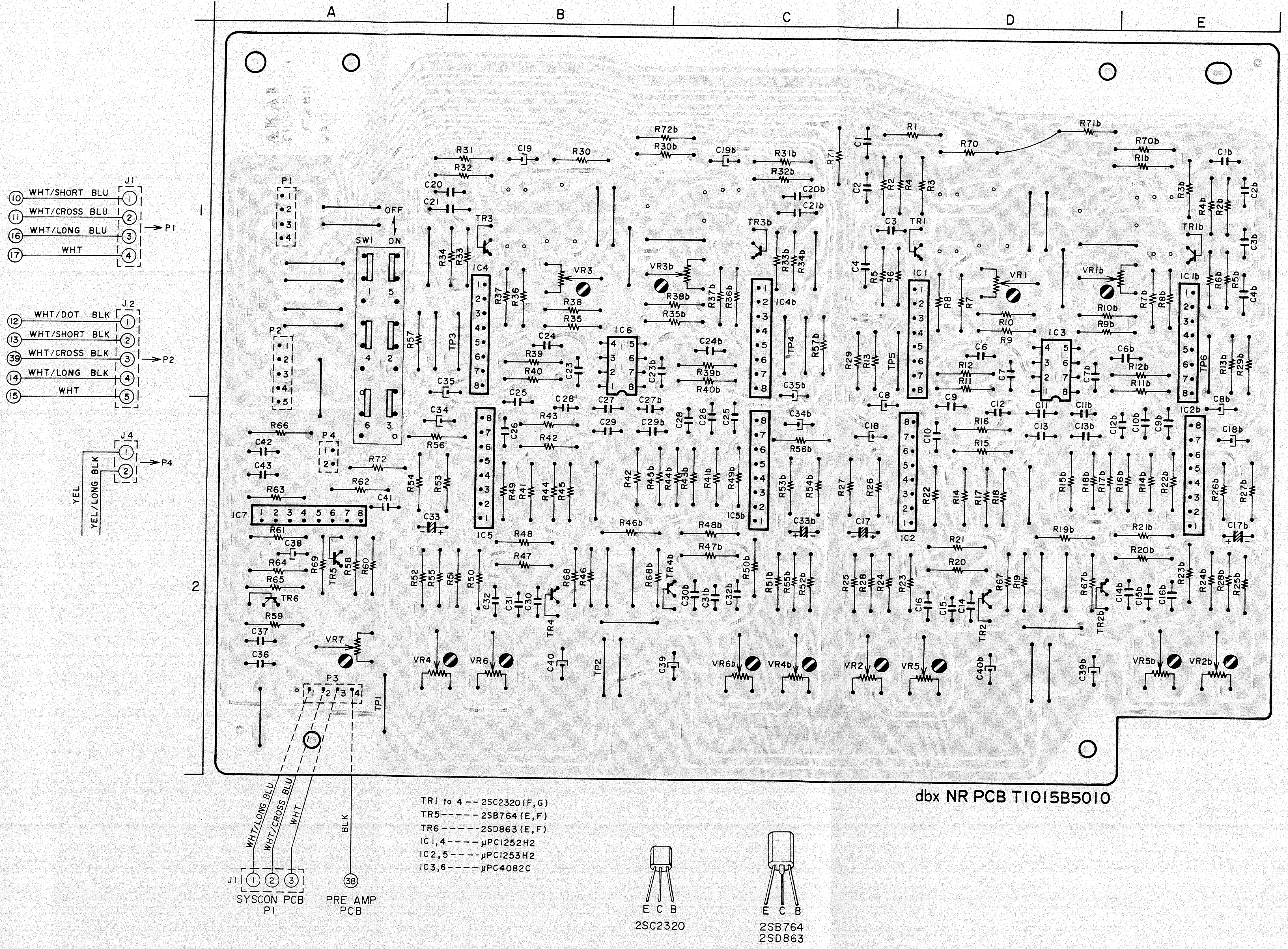
3) Meter P.C Board T1015D5030


J9
PRE AMP PCB
WHT
PNK
WHT
YLW
PNK
WHT RED WHT
WHT GRY WHT
RIGHT
FWD
REC HEAD
LEFT
FWD
ERASE HEAD
RIGHT
REV
ERASE HEAD
LEFT
REV
REC HEAD
RIGHT
BLK RED BLK
BLK GRY BLK
WHT GRY WHT
WHT RED WHT
J4
J3
P4
P3
P1
P2
WHT/LONG BLU
METER LAMP
B C E
2SC1312R
R1
R2
R3
R4
R5
R6
C1
C1b
TR1
TR1b
R1b
R2b
R3b
R4b
R5b
TR2
TR2b
TR1,2
2SC1312R(G,H)
AKAI T1015D5030
YLW
YLW/LONG RED
YLW/CROSS RED
PRE AMP PCB
METER PCB T1015D5030
WHT
WHT/LONG BLU
WHT/CROSS BLU
WHT/SHORT BLU
PRE AMP PCB
J8
PRE AMP PCB

4) Mic P.C Board T1015C5020


BIAS FILTER
FL1
FL1b
LINE
VR2b
R10b
MIC
VR1b
LINE
VR2
MIC
VR1
BLU BLK
WHT
BLK
TR1b
TR2b
TR3b
TR4b
TR5b
TR6b
TR1
TR2
TR3
TR4
TR5
TR6
MIC PC BOARD T1015C5020
(R) GND (L)
OUT
(R) (L)
LINE IN
(R) GND (L)
MIC IN
+B
TR1,4 2SC1844(E,F)
TR2,3 2SC1843 (E,F)
TR5 2SC2909(R,S)
TR6 2SA1207(R,S)
E C B
2SC1843
2SC1844
2SC2909
2SA1207

5) dBx NR P.C Board T1015B5010


A
B
C
D
E
1
2
⑩ WHT/SHORT BLU
⑪ WHT/CROSS BLU
⑯ WHT/LONG BLU
⑰ WHT
J1
P1
⑫ WHT/DOT BLK
⑬ WHT/SHORT BLK
㊴ WHT/CROSS BLK
⑭ WHT/LONG BLK
⑮ WHT
J2
P2
J4
P4
YEL
YEL/LONG BLK
AKAI
SW1
OFF
ON
IC1
IC1b
IC2
IC2b
IC3
IC4
IC4b
IC5
IC5b
IC6
IC7
P3
TP1
TP2
TP3
TP4
TP5
TP6
WHT/LONG BLU
WHT/CROSS BLU
WHT
BLK
J1 ① ② ③
SYSCON PCB
P1
㊳
PRE AMP
PCB
E C B
2SC2320
E C B
2SB764
2SD863

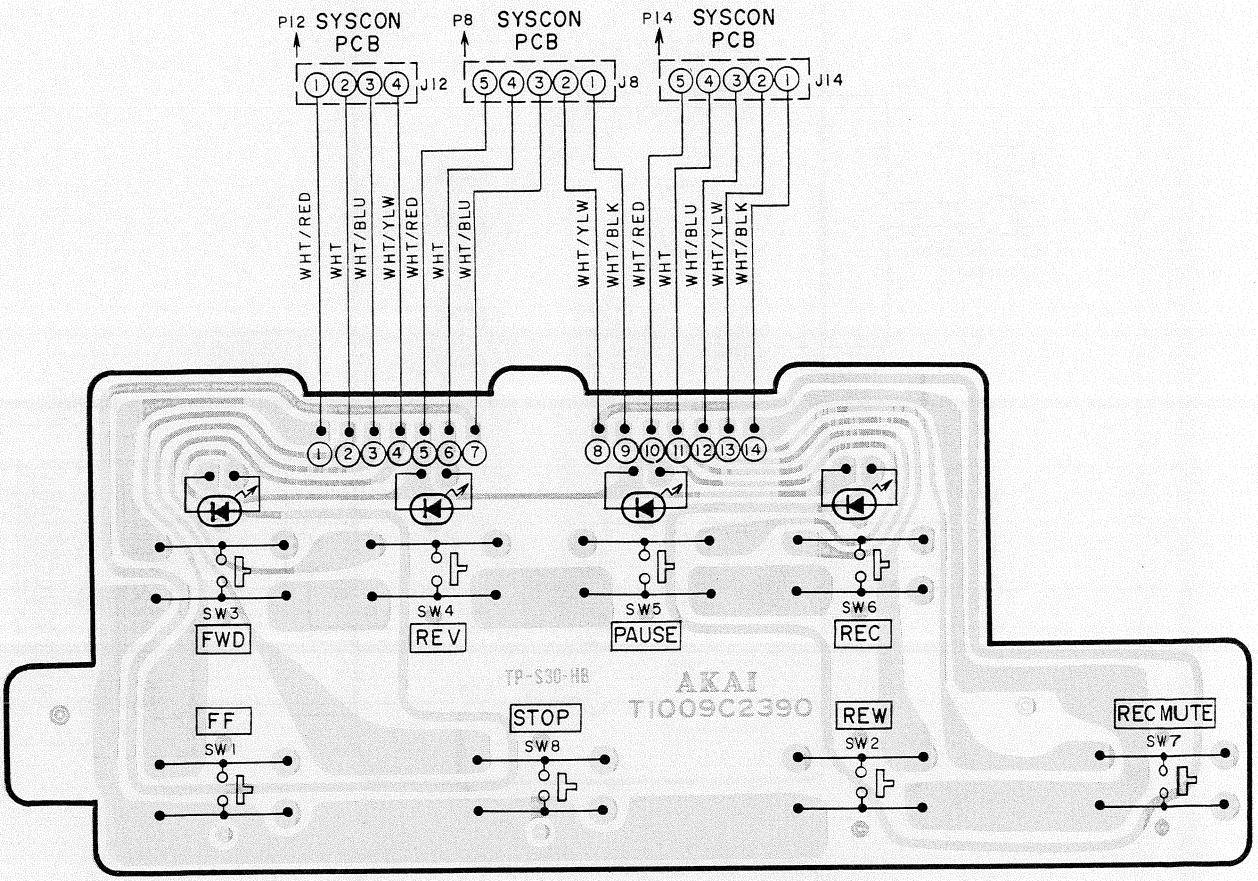
dbx NR PCB T1015B5010

TR1 to 4 -- 2SC2320(F,G)
TR5------2SB764(E,F)
TR6------2SD863(E,F)
IC1,4-----μPC1252H2
IC2,5-----μPC1253H2
IC3,6-----μPC4082C

LOCATION OF
COMPONENTS

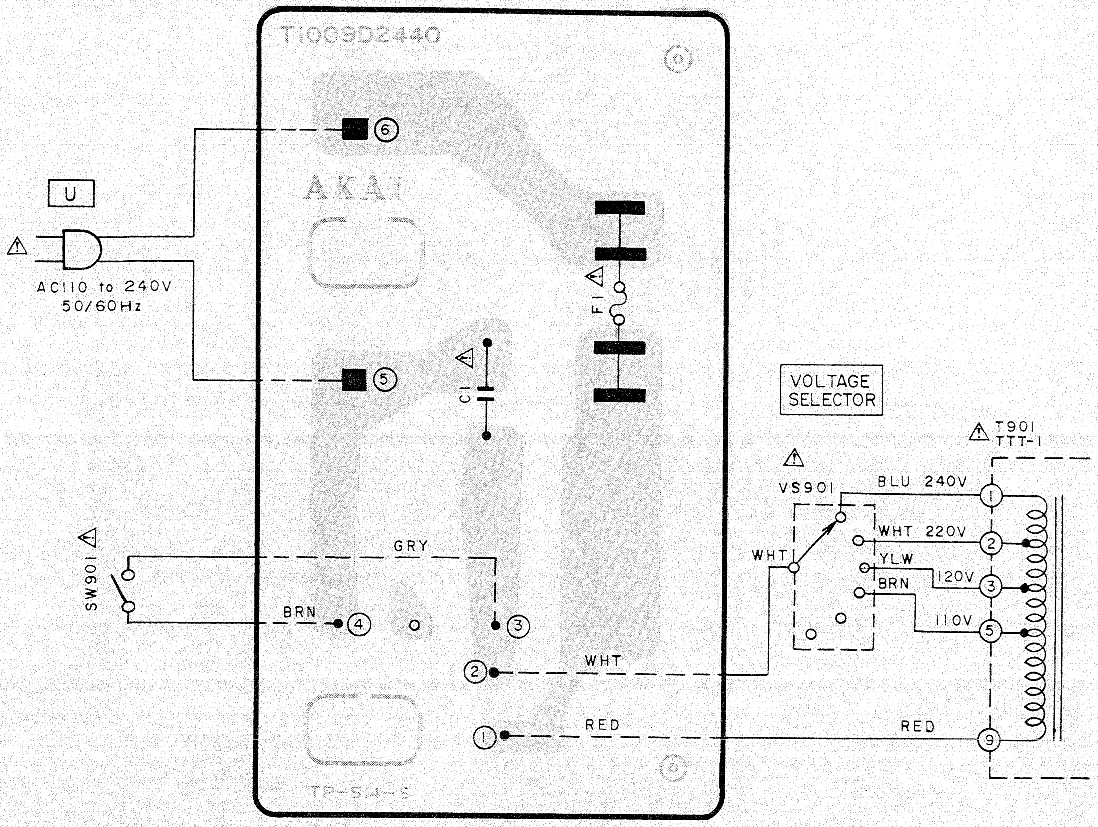
TR1.....D1
TR1b....E1
TR2.....D2
TR2b....D2
TR3.....B1
TR3b....C1
TR4.....B2
TR4b....C2
TR5,6...A2
IC1.....D1
IC1b....E1
IC2.....D2
IC2b....E2
IC3.....D1
IC4.....B1
IC4b....C1
IC5.....B2
IC6.....B1

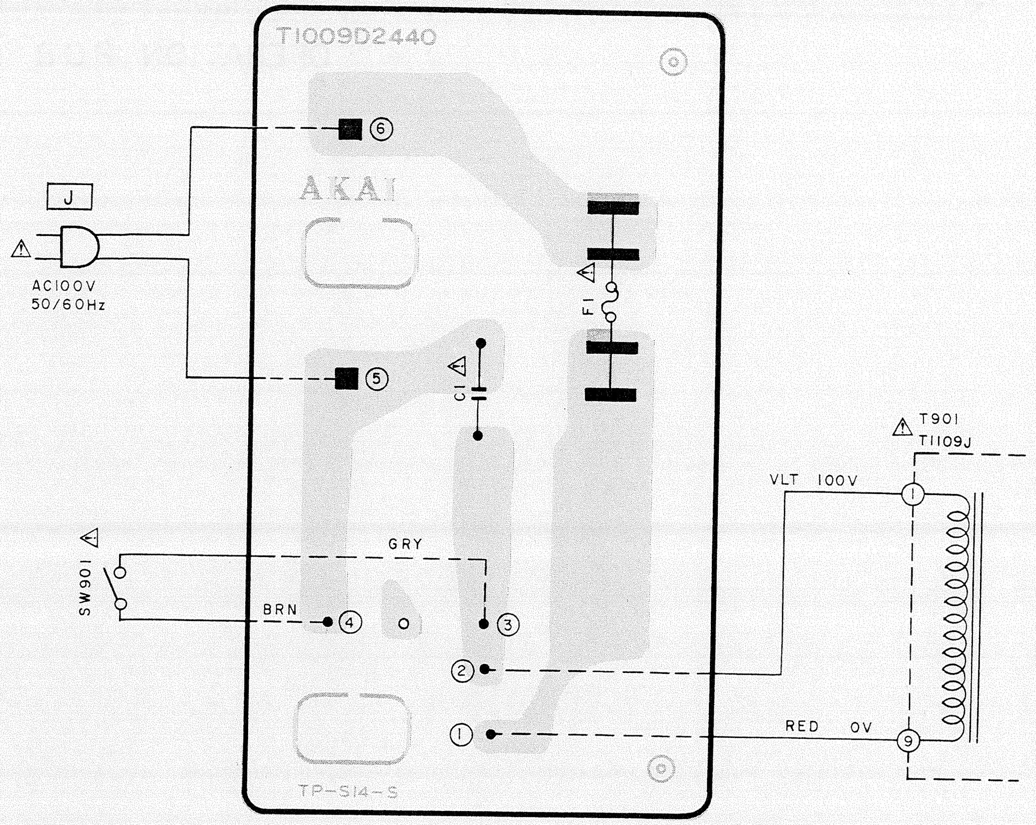
6) Operation P.C Board T1009C2390


P12 SYSCON PCB
P8 SYSCON PCB
P14 SYSCON PCB
J12
J8
J14
WHT/RED
WHT
WHT/BLU
WHT/YLW
WHT/RED
WHT
WHT/BLU
WHT/YLW
WHT/BLK
WHT/RED
WHT
WHT/BLU
WHT/YLW
WHT/BLK
SW3
FWD
SW4
REV
SW5
PAUSE
SW6
REC
TP-S30-HB
AKAI
T1009C2390
FF
SW1
STOP
SW8
REW
SW2
REC MUTE
SW7

OPERATION PCB T1009C2390

### 7) Fuse (A) P.C Board T1009D2440

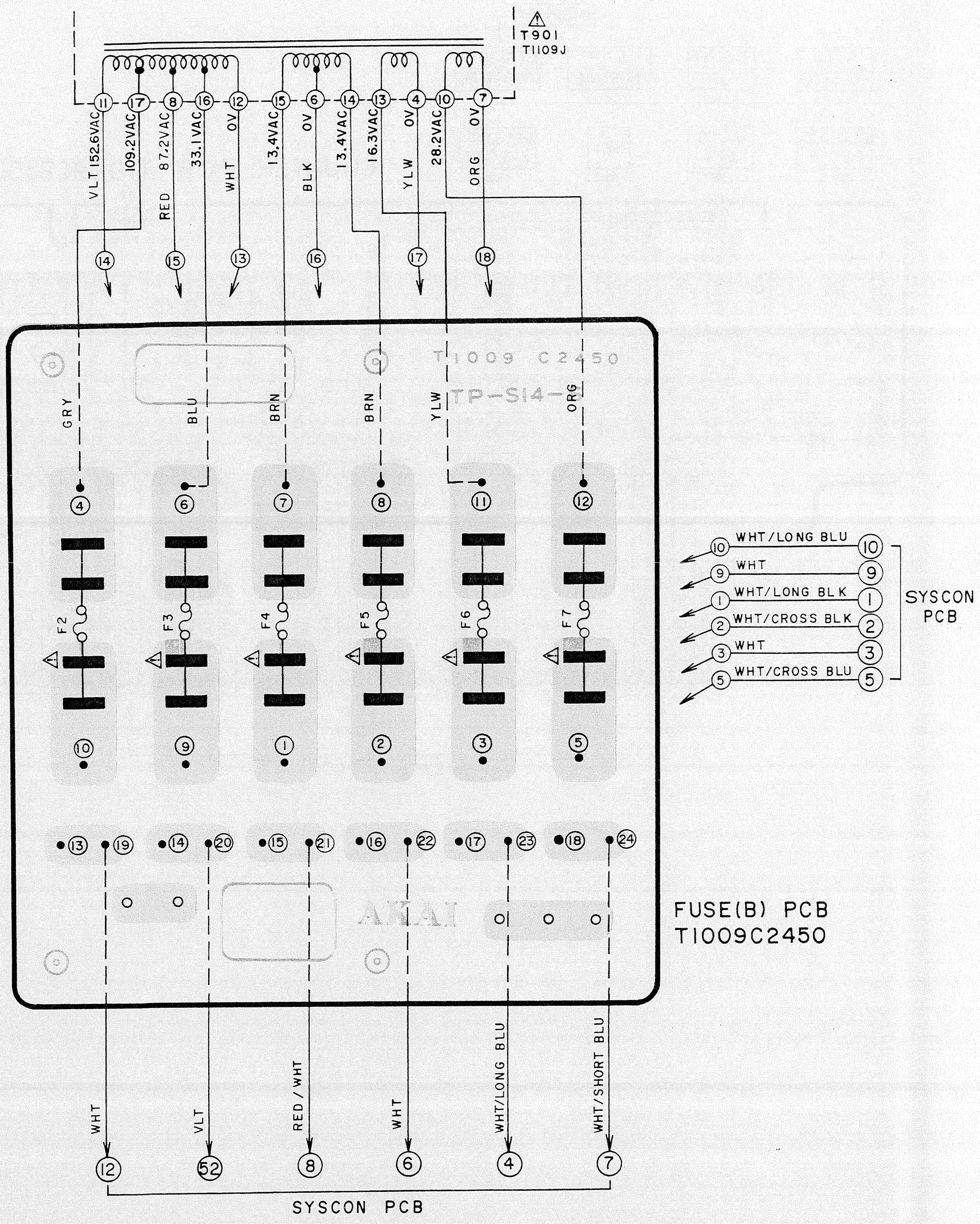

T1009D2440
AKAI
U
AC110 to 240V
50/60Hz
⑥
⑤
F1
C1
VOLTAGE SELECTOR
T901
TTT-1
VS901
BLU 240V
WHT 220V
YLW
BRN
120V
110V
WHT
SW901
GRY
BRN
④
③
②
WHT
①
RED
RED
⑨
TP-S14-S


T1009D2440
AKAI
J
AC100V
50/60Hz
⑥
⑤
F1
C1
T901
T1109J
VLT 100V
SW901
GRY
BRN
④
③
②
①
RED 0V
⑨
TP-S14-S

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

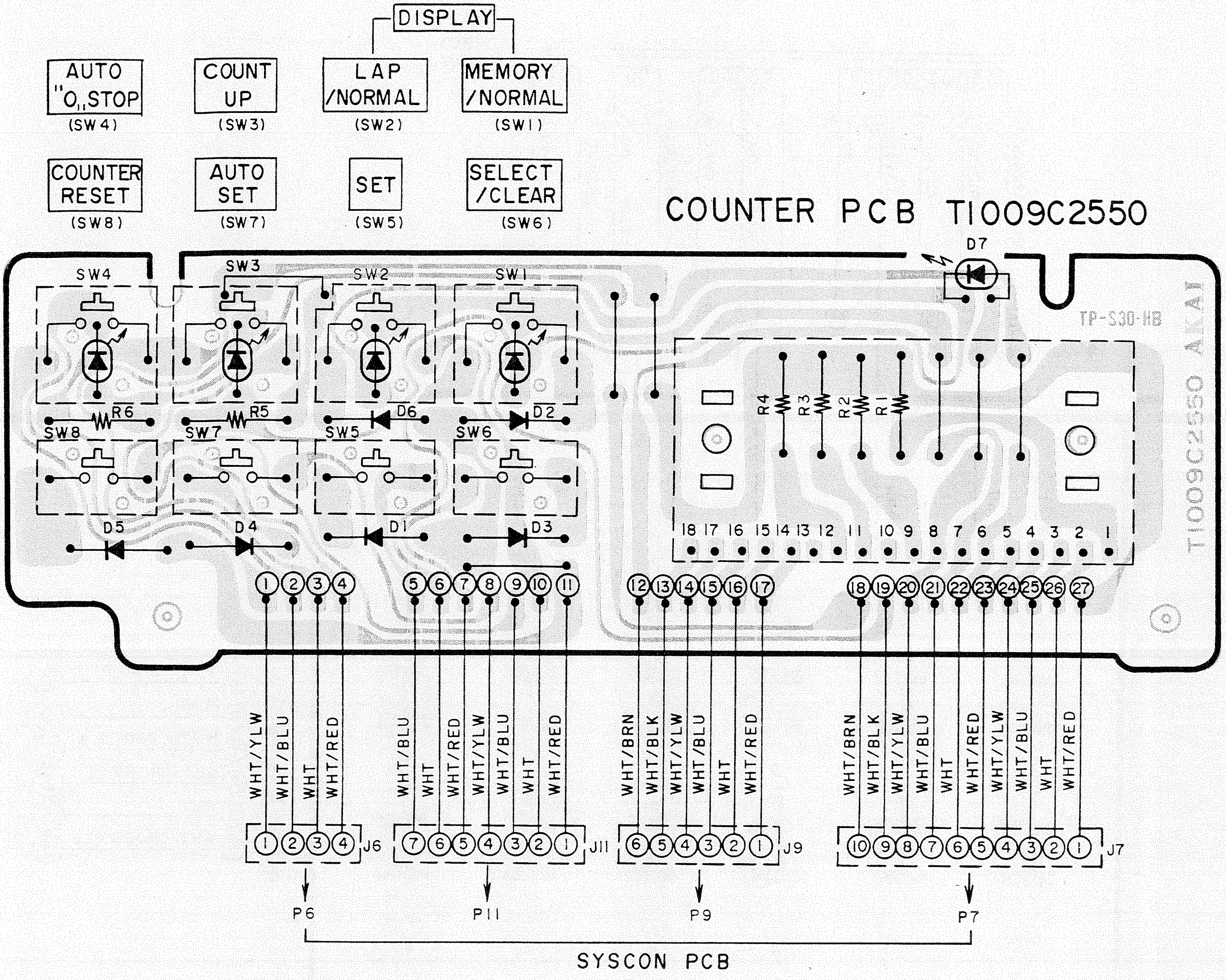
## 8) Fuse (B) P.C Board T1009C2450


T901
T1109J
⑪ ⑰ ⑧ ⑯ ⑫ ⑮ ⑥ ⑭ ⑬ ④ ⑩ ⑦
VLT 152.6VAC
109.2VAC
RED 87.2VAC
33.1VAC
WHT 0V
13.4VAC
BLK 0V
13.4VAC
16.3VAC
YLW 0V
28.2VAC
ORG 0V
⑭ ⑮ ⑬ ⑯ ⑰ ⑱
T1009 C2450
TP-S14
GRY
BLU
BRN
BRN
YLW
ORG
④ ⑥ ⑦ ⑧ ⑪ ⑫
F2
F3
F4
F5
F6
F7
⑩ ⑨ ① ② ③ ⑤
⑬ ⑲ ⑭ ⑳ ⑮ ㉑ ⑯ ㉒ ⑰ ㉓ ⑱ ㉔
AKAI
WHT/LONG BLU ⑩
WHT ⑨
WHT/LONG BLK ①
WHT/CROSS BLK ②
WHT ③
WHT/CROSS BLU ⑤
SYSCON PCB
FUSE(B) PCB
T1009C2450
WHT ⑫
VLT (52)
RED/WHT ⑧
WHT ⑥
WHT/LONG BLU ④
WHT/SHORT BLU ⑦
SYSCON PCB

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

9) Counter P.C Board T1009C2550


DISPLAY
AUTO "0" STOP (SW4)
COUNT UP (SW3)
LAP /NORMAL (SW2)
MEMORY /NORMAL (SW1)
COUNTER RESET (SW8)
AUTO SET (SW7)
SET (SW5)
SELECT /CLEAR (SW6)
COUNTER PCB T1009C2550
D7
SW4
SW3
SW2
SW1
R6
R5
D6
D2
SW8
SW7
SW5
SW6
D5
D4
D1
D3
R4
R3
R2
R1
TP-S30-HB
AKAI
T1009C2550
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗
WHT/YLW
WHT/BLU
WHT
WHT/RED
WHT/BLU
WHT
WHT/RED
WHT/YLW
WHT/BLU
WHT
WHT/RED
WHT/BRN
WHT/BLK
WHT/YLW
WHT/BLU
WHT
WHT/RED
WHT/BRN
WHT/BLK
WHT/YLW
WHT/BLU
WHT
WHT/RED
WHT/YLW
WHT/BLU
WHT
WHT/RED
① ② ③ ④ J6
⑦ ⑥ ⑤ ④ ③ ② ① J11
⑥ ⑤ ④ ③ ② ① J9
⑩ ⑨ ⑧ ⑦ ⑥ ⑤ ④ ③ ② ① J7
P6
P11
P9
P7
SYSCON PCB

## —MEMO—

# —MEMO—

# —MEMO—

## —MEMO—

## SECTION 2

# PARTS LIST

## TABLE OF CONTENTS

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Resistor and Capacitor which is not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

**ATTENTION**

1. When placing an order for parts, be sure to list the parts no. model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Parts List may be partially changed, please use this parts list for all future reference.

## HOW TO USE THIS PARTS LIST

1. This Parts List shows the parts that are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts". Select and order such parts from the "Common List for Service Parts".
2. The Recommended Spare Parts shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not be supplied in principle.
4. How to read list
   a) Mechanism Block

### 2. HEAD BASE BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 2-1x | BH-T2023A320A | HEAD BASE BLOCK GX-F66R |
| 2-2 | HP-H2206A010A | HEAD R/P PR4-8FU C |
| 2-3 | ZS-477876 | PAN20x03STL CMT |
| 2-4 | ZS-536488 | BID20x08STL CMT |
| 2-5 | ZG-402895 | CS ANGLE ADJUST SPRING |

SP (Service Parts) Classification

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

This number corresponds with the individual parts index number in that figure

This number corresponds with the Figure Number

   b) P.C Board Block

### 6. SYS. CON. P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-1 | BA-T2034A070A | PC SYS CON BLK GX-F44R |
| 6-IC1 | EI-324536 | IC HD14049BP |
| 6-IC2 | EI-336801 | IC MB8841-564M |
| 6-IC3 | EI-331661 | IC SN7405N |
| 6-IC4 | EI-336725 | IC M54527P |
| 6-TR1to4 | ET-200985 | TR 2SC2603 F,G |
| 6-TR5to28 | ET-554657 | TR 2SA733A P,Q |
| 6-D1 | ED-318292 | D SILICON H 1S2473T-77 T26 |
| 6-D2to4 | ED-308952 | D GERMA V 1K34A-LR F07 |
| 6-D5to10 | ED-318292 | D SILICON H 1S2473T-77 T26 |
| 6-X1 | EI-318384 | OSC X'TAL NC-18C<br>3.579545MHZ |

SP (Service Parts) Classification

This reference numbers corresponds with symbol numbers of Schematic Diagrams.

5. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List. It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index.

**WARNING**

**⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS**

**AVERTISSEMENT**

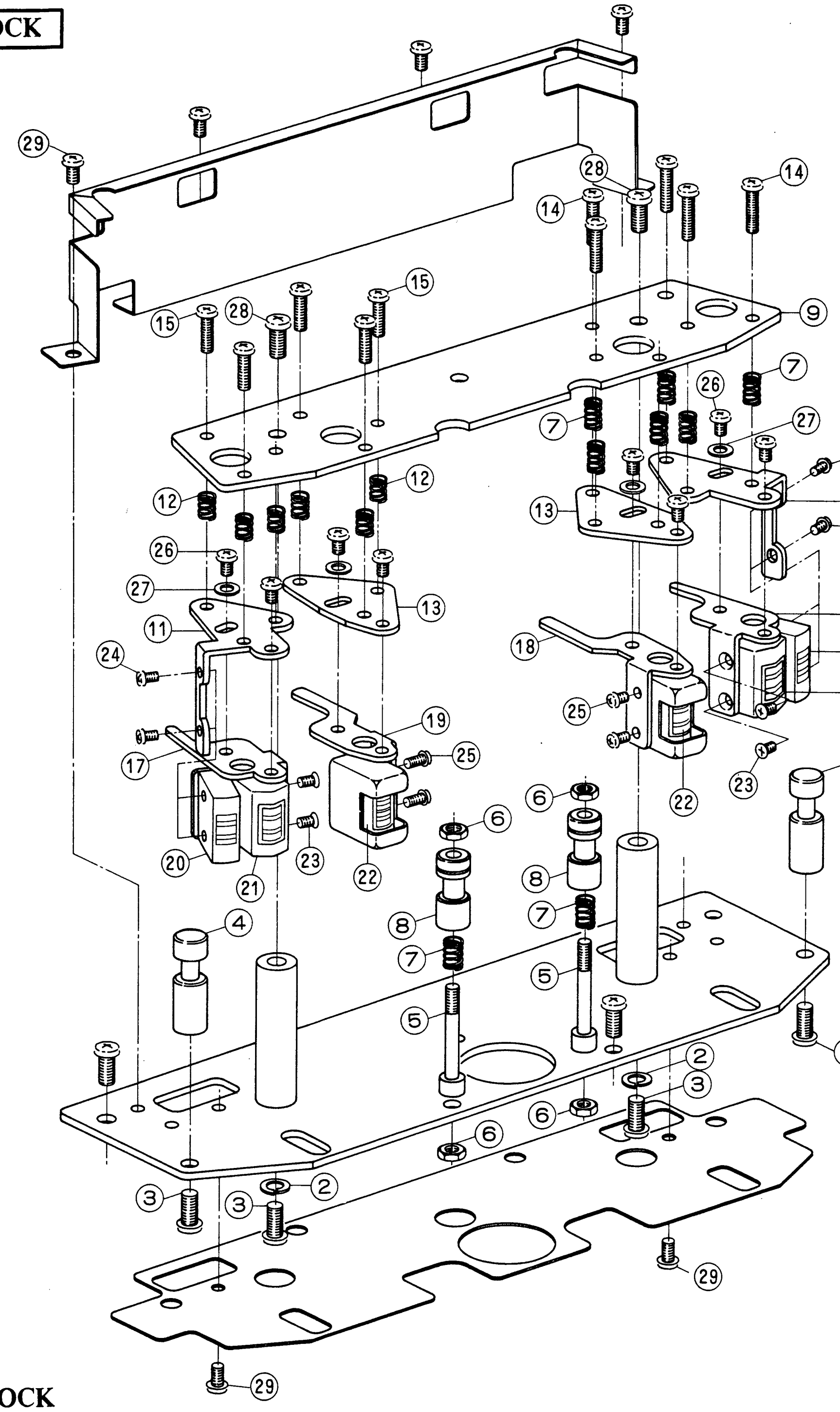
**⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDEES PAR LE FABRICANT**

## RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 1 | BH-T1009A320A | HEAD BLK GX-747 |
| 2 | BM-M1101A010A | ⚠MOTOR SCM-200 |
| 3 | BM-319631 | ⚠MOTOR VA208801 |
| 4 | BM-M1202A010A | ⚠MOTOR 24XO-TD |
| 5 | BT-330329 | ⚠TRANS POWER TTT-1 |
| 6 | BT-344145 | ⚠TRANS POWER T1109J |
| 7 | BZ-T1009A140A | ROLLER TABLE (L) BLK GX-747 |
| 8 | BZ-T1009A140B | ROLLER TABLE (L) BLK GX-747-BL |
| 9 | BZ-T1009A220A | ROLLER TABLE (R) BLK GX-747 |
| 10 | BZ-T1009A220B | ROLLER TABLE (R) BLK GX-747-BL |
| 11 | ED-313566 | ⚠D SILICON GP-25G 400/2.5A |
| 12 | ED-330987 | ⚠D SILICON RB152 200/1.5A |
| 13 | ED-326168 | ⚠D SILICON 1D4B1 200/1.5A |
| 14 | ED-324669 | ⚠D SILICON 10D4-FA-2 F12 400/1.0A |
| 15 | ED-324668 | ⚠D THYRISTOR AC03BGML 200V 3A |
| 16 | ED-324667 | ⚠D THYRISTOR 2P1M 100V 2A |
| 17 | ED-330361 | D COMP 03-0034 |
| 18 | ED-308953 | D GERMA H 1K34A-LH S12 |
| 19 | ED-322982 | D GERMA V 1S188FM-1-LR F07 |
| 20 | ED-330996 | D LED GL-5HY5 YLW |
| 21 | ED-330997 | D LED GL-5PR5 RED |
| 22 | ED-322247 | D LED SLP-151D RED |
| 23 | ED-337414 | D LED SLP-235B GRN |
| 24 | ED-330995 | D LED SLP-260C GRN |
| 25 | ED-316143 | D SILICON H 1S2473HS F10 |
| 26 | ED-560913 | D SILICON V 1S2473VE |
| 27 | ED-323979 | D SILICON W03B F12 100/1.0A |
| 28 | ED-306109 | D SILICON W03B 100/1.0A |
| 29 | ED-494583 | D SILICON 10D05 50/1.0A |
| 30 | ED-224550 | D SILICON 10D4 400/1.0A |
| 31 | ED-330988 | D ZENER H HZ11 C2 |
| 32 | ED-324526 | D ZENER H HZ12 C1 |
| 33 | ED-313623 | D ZENER H HZ22 3 |
| 34 | ED-329051 | D ZENER H HZ24 3 |
| 35 | ED-302269 | D ZENER H HZ5 A2 |
| 36 | ED-302295 | D ZENER H HZ7 C3 |
| 37 | ED-331185 | D ZENER V HZ12 C2 |
| 38 | EF-691007 | ⚠FUSE SEMKO T 250V 3.15A (U) |
| 39 | EF-327103 | ⚠FUSE TSC A 250V 0.50A (U) |
| 40 | EF-309388 | ⚠FUSE TSC A 250V 0.80A (U,J) |
| 41 | EF-306949 | ⚠FUSE TSC A 250V 1.25A (U,J) |
| 42 | EF-311839 | ⚠FUSE TSC A 250V 1.6A (U,J) |
| 43 | EI-330352 | IC BA6109 |
| 44 | EI-257602 | IC MC14011BCP |
| 45 | EI-696363 | IC MC14049BCP |
| 46 | EI-336994 | IC M5230L |
| 47 | EI-344144 | IC µPC1252H2 |
| 48 | EI-337360 | IC µPC4082C |
| 49 | EI-330985 | IC µPD553C-110 |
| 50 | EI-330984 | IC µPD553C-152 |
| 51 | EJ-324276 | DIN J TCS4680-01-111 P 8P |
| 52 | EL-324540 | PL H LEAD 12V 55mA |
| 53 | EM-330992 | IND LE SL-1574W CHARACTER (IN1) |
| 54 | EM-330374 | METER VU D64A24L 0.260mA(ME1,2) |
| 55 | EM-330600 | METER VU D64A27L 0.260mA (BL) |
| 56 | EP-330363 | ⚠SOLENOID 0730FLT2 29V (SL901) |
| 57 | EP-315918 | ⚠SOLENOID 1240PLTI |
| 58 | EP-316121 | ⚠SOLENOID 1664PLTI (SL904) |
| 59 | EP-308973 | RELAY LEAD LAB2NS 2NO 24V |
| 60 | EP-308949 | RELAY POWER FBR211BD024-M 1TR 24V |
| 61 | EP-324672 | RELAY POWER FBR321D012-K 2TR 12V |
| 62 | EP-300132 | RELAY POWER MY4-02-US-L 4TR 24V |
| 63 | EP-330351 | RELAY SIGNAL G2KU 1TR 24V |
| 64 | ER-308955 | ⚠R CT P 20W 360K |
| 65 | ER-315356 | ⚠R CT P 20W 551K |
| 66 | ER-326169 | ⚠R FUSE ERD2FC S10 1/4W 22R0G |
| 67 | ER-328520 | ⚠R FUSE ERD2FC S10 1/4W 1000G |
| 68 | ER-326167 | ⚠R FUSE 20W 390K |
| 69 | ES-330888 | ⚠SW PUSH ESB-70240R 01-1 J (J) |
| 70 | ES-330887 | ⚠SW PUSH ESB-70411S 01-1ESB (U) |
| 71 | ES-319464 | SW LEVER 00420460 2-04-02S |
| 72 | ES-319448 | SW LEVER 00420461 2-04-02N |
| 73 | ES-573478 | SW MICRO K3 UC |
| 74 | ES-319156 | SW MICRO SS-1-E-4 UC |
| 75 | ES-326720 | SW MICRO VV-S-01 |
| 76 | ES-330993 | SW PUSH SUE-12 2-04-02N |
| 77 | ES-330372 | SW PUSH SUE24 2-THROW |
| 78 | ES-344143 | SW PUSH SUL192A 2-06-02N |
| 79 | ES-306714 | SW ROTARY SRU1023N 1-02-03N |
| 80 | ES-301436 | SW SLIDE CL206E 2-06-02S |
| 81 | ES-301435 | SW SLIDE CL210E 2-10-02S |
| 82 | ES-309094 | SW SLIDE SL13-6-6-2-2 2-02-02N |
| 83 | ES-315362 | SW TACT AKC8S |
| 84 | ES-323367 | SW TACT KEC10001 |
| 85 | ES-319624 | SW TACT KEC11903 |
| 86 | ET-318237 | ⚠TR 2SB764 E,F |
| 87 | ET-200399 | ⚠TR 2SB856 B,C |
| 88 | ET-375603 | ⚠TR 2SC1061 B,C |
| 89 | ET-517263 | ⚠TR 2SC1312R G,H |
| 90 | ET-308937 | ⚠TR 2SC2130 G,H |
| 91 | ET-308947 | ⚠TR 2SC2336B Q,R |
| 92 | ET-639437 | ⚠TR 2SC945L Q,P |
| 93 | ET-307349 | ⚠TR 2SD794 P,Q |
| 94 | ET-328440 | ⚠TR 2SD863-V8 E,F |
| 95 | ET-324539 | TR PHOTO PT-410C C |
| 96 | ET-338244 | TR 2SA1207 R,S |
| 97 | ET-554657 | TR 2SA733A P,Q |
| 98 | ET-666415 | TR 2SB605 K,L |
| 99 | ET-318237 | TR 2SB764 E,F |
| 100 | ET-517263 | TR 2SC1312R G,H |
| 101 | ET-337258 | TR 2SC1843 E,F |
| 102 | ET-308954 | TR 2SC1844 E,F |
| 103 | ET-311336 | TR 2SC2130 H |
| 104 | ET-330270 | TR 2SC2320 F,G |
| 105 | ET-338181 | TR 2SC2909 R,S |
| 106 | ET-346113 | TR 2SC3068 |
| 107 | ET-391768 | TR 2SC458LG C,D |
| 108 | ET-635220 | TR 2SC945L K,P |
| 109 | ET-399846 | TR 2SC945L Q |
| 110 | ET-639437 | TR 2SC945L Q,P |
| 111 | ET-666404 | TR 2SD571 K,L |
| 112 | ET-328440 | TR 2SD863-V8 E,F |
| 113 | EV-319625 | VR ROTARY 16L10×0QB102 (VR901) |
| 114 | EV-319494 | VR ROTARY 16P11×0UA503 A503 |
| 115 | EV-319316 | VR ROTARY 16P20×2AB103 |
| 116 | EV-331189 | VR ROTARY 16P20×2BB502 |
| 117 | EZ-324787 | FHOTO SENSOR TLP504 |
| 118 | HE-H1305A010A | HEAD E E4-245 O |
| 119 | HP-H1005A010A | HEAD PB P4-500 O |
| 120 | HR-H1101A010A | HEAD REC R4-241 O |
| 121 | MB-330938 | DETECTION BELT |
| 122 | MB-331022 | ROLLER BELT |
| 123 | MB-331021 | TENSION ARM BELT |
| 124 | MP-B424023 | PINCH ROLLER PART KD |
| 125 | MT-T1003A340A | BRAKE CLOTH ASSY GX-215D |

## HEAD BLOCK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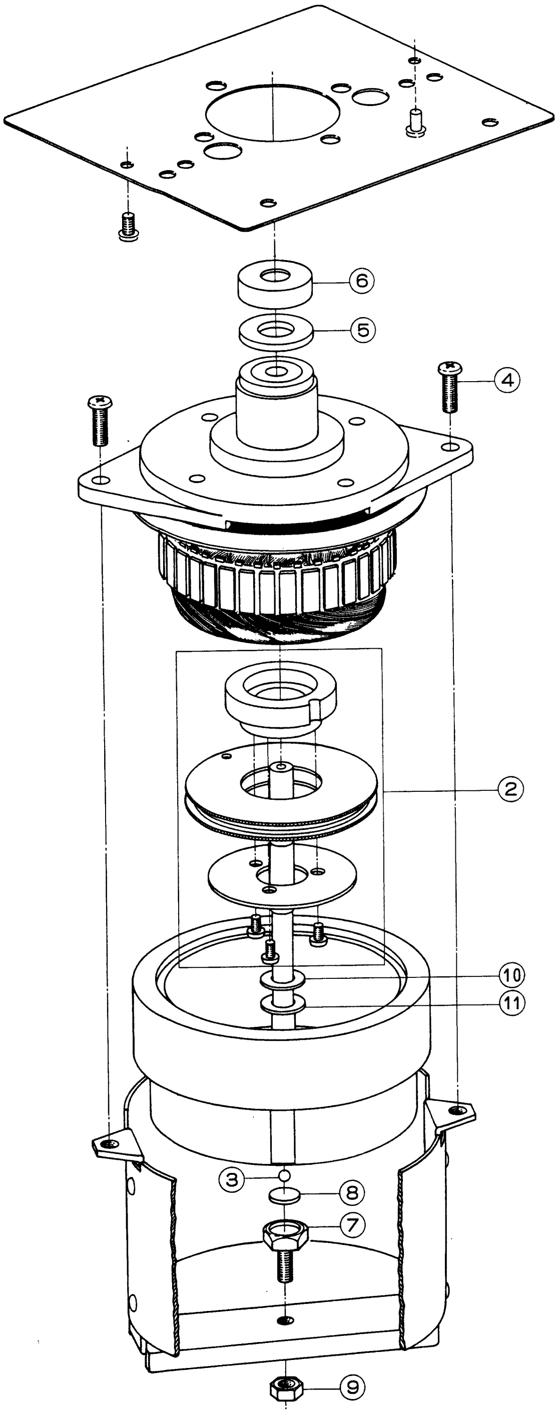
## 1. HEAD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 1-1x | BH-T1009A320A | HEAD BLK GX-747 |
| 1-2 | ZW-273914 | SW40 |
| 1-3 | ZS-413201 | PAN40×08STL CMT |
| 1-4 | HZ-528581 | TAPE GUIDE (A) |
| 1-5 | MH-578957 | TAPE GUIDE PROP |
| 1-6 | ZW-265522 | N30BRS NI3 2 |
| 1-7 | ZG-466312 | ANGLE ADJUST SPRING (E) |
| 1-8 | HZ-301777 | TAPE GUIDE (C) |
| 1-9 | HZ-308681 | HEAD SUB CHASSIS |
| 1-10 | HB-331113A | ER HEAD BASE (A) |
| 1-11 | HB-331113B | ER HEAD BASE (B) |
| 1-12 | ZG-540584 | ANGLE ADJUST SPRING (G) |
| 1-13 | HZ-308685 | PB HEAD BASE |
| 1-14 | ZS-608501 | PAN30×12STL BNI |
| 1-15 | ZS-417407 | PAN30×10STL BNI |
| 1-16 | HA-309409 | ER HEAD ANGLE (A) |
| 1-17 | HA-309410 | ER HEAD ANGLE (B) |
| 1-18 | HA-330924A | PB HEAD ANGLE (R) |
| 1-19 | HA-330924B | PB HEAD ANGLE (L) |
| 1-20 | HE-H1305A010A | HEAD E E4-245 O |
| 1-21 | HR-H1101A010A | HEAD REC R4-241 O |
| 1-22 | HR-H1005A010A | HEAD PB P4-500 O |
| 1-23 | ZS-524812 | CTS20×04STL CMT |
| 1-24 | ZS-460440 | PAN20×04STL CMT |
| 1-25 | ZS-608095 | PAN20×05STL CMT |
| 1-26 | ZS-608477 | PAN30×04STL BNI |
| 1-27 | ZW-309055 | PW30×060X050STL BNI |
| 1-28 | ZS-201778 | PAN40×08STL BNI |
| 1-29 | ZS-422076 | PAN30×05STL CMT |

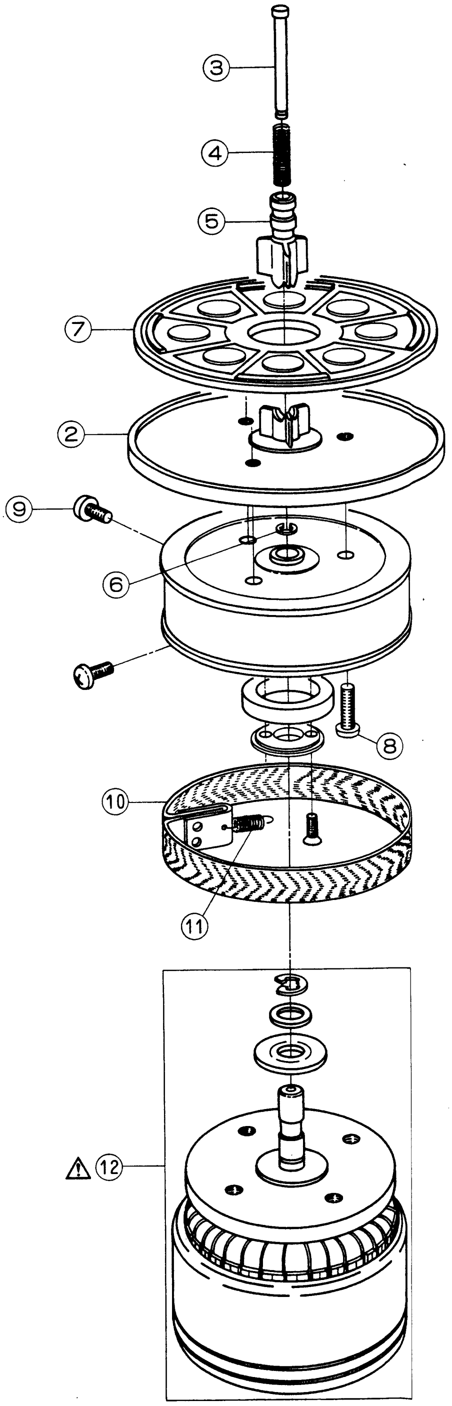
## MOTOR BLOCK



## 2. MOTOR BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 2-1x | BM-M1101A010A | ⚠ MOTOR SCM-200 |
| 2-2 | BZ-M1101A040A | DETECTION GEAR BLK SCM-200 |
| 2-3 | MV-368886 | BALL 300STL |
| 2-4 | ZS-413201 | PAN40×08STL CMT |
| 2-5 | ZW-597622 | FELT WASHER |
| 2-6 | SK-597633 | CAP |
| 2-7 | MZ-585900 | SHAFT SUPPORT |
| 2-8 | MZ-597690 | BALL HOLDER |
| 2-9 | ZW-413278 | N50STL CMT 1 |
| 2-10 | ZW-597543 | THRUST WASHER |
| 2-11 | ZW-605698 | THRUST WASHER (B) |

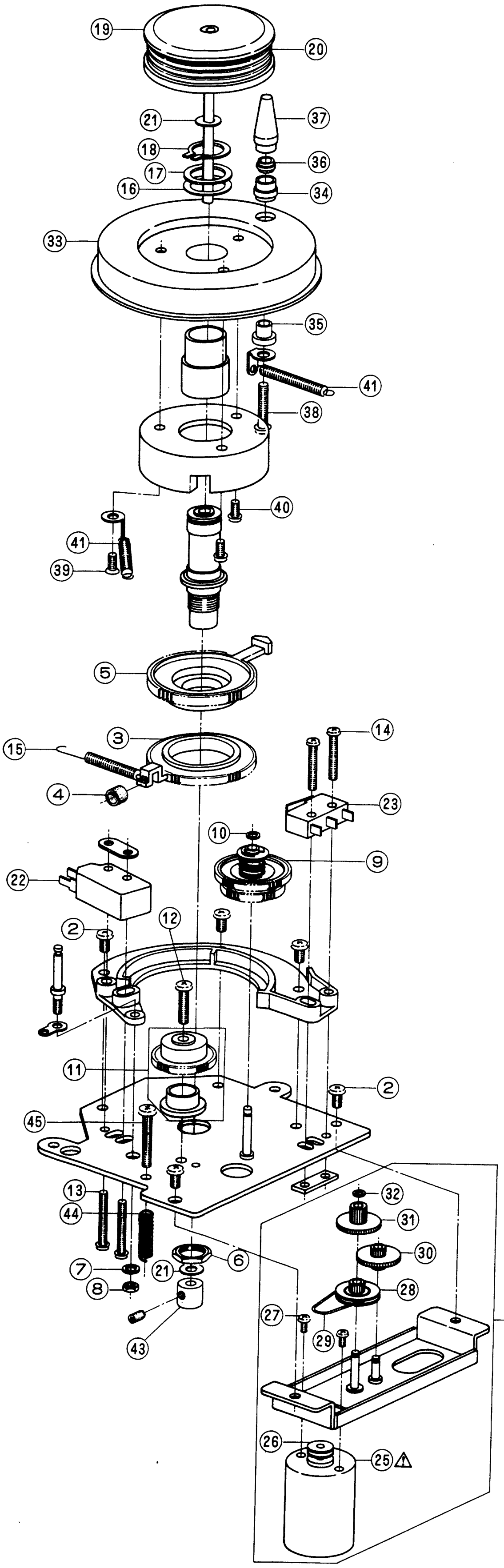
## REEL TABLE BLOCK



## 3. REEL TABLE BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 3-1x | BR-T1005A110B | REEL TABLE BLK TE(TAKE-UP) |
| 3-2 | MT-534666 | REEL TABLE |
| 3-3 | MS-342000 | REEL SHAFT |
| 3-4 | ZG-540617 | CLAMPER SPRING |
| 3-5 | MT-534677 | REEL CLAMPER |
| 3-6 | ZW-270088 | RING E 190SUP CMT |
| 3-7 | MT-534688 | REEL TABLE RUBBER |
| 3-8 | ZS-419670 | PAN30×12STL CMT |
| 3-9 | ZS-424056 | PAN40×10STL CMT |
| 3-10 | MT-T1003A340A | BRAKE CLOTH ASSY GX-215D |
| 3-11 | ZG-317496 | FELT TENSION SPRING |
| 3-12 | BM-M1202A010A | ⚠ MOTOR 24XO-TD |

## ROLLER TABLE (L/R) BLOCK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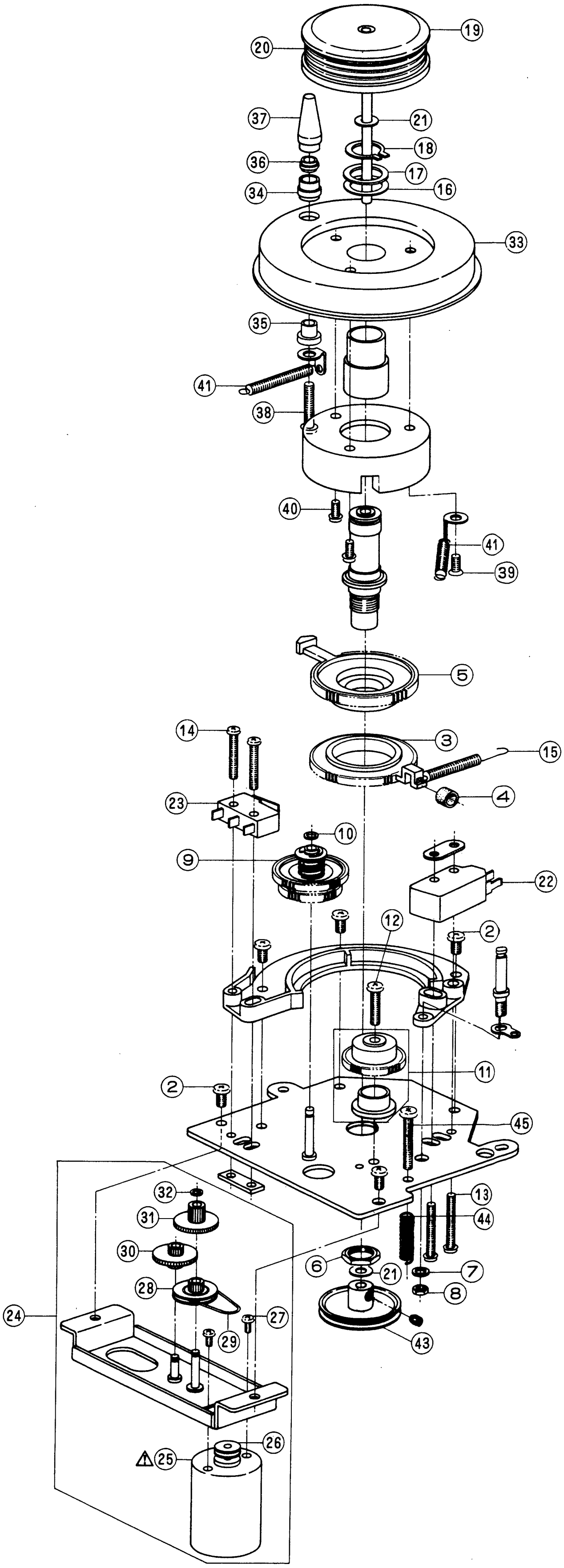
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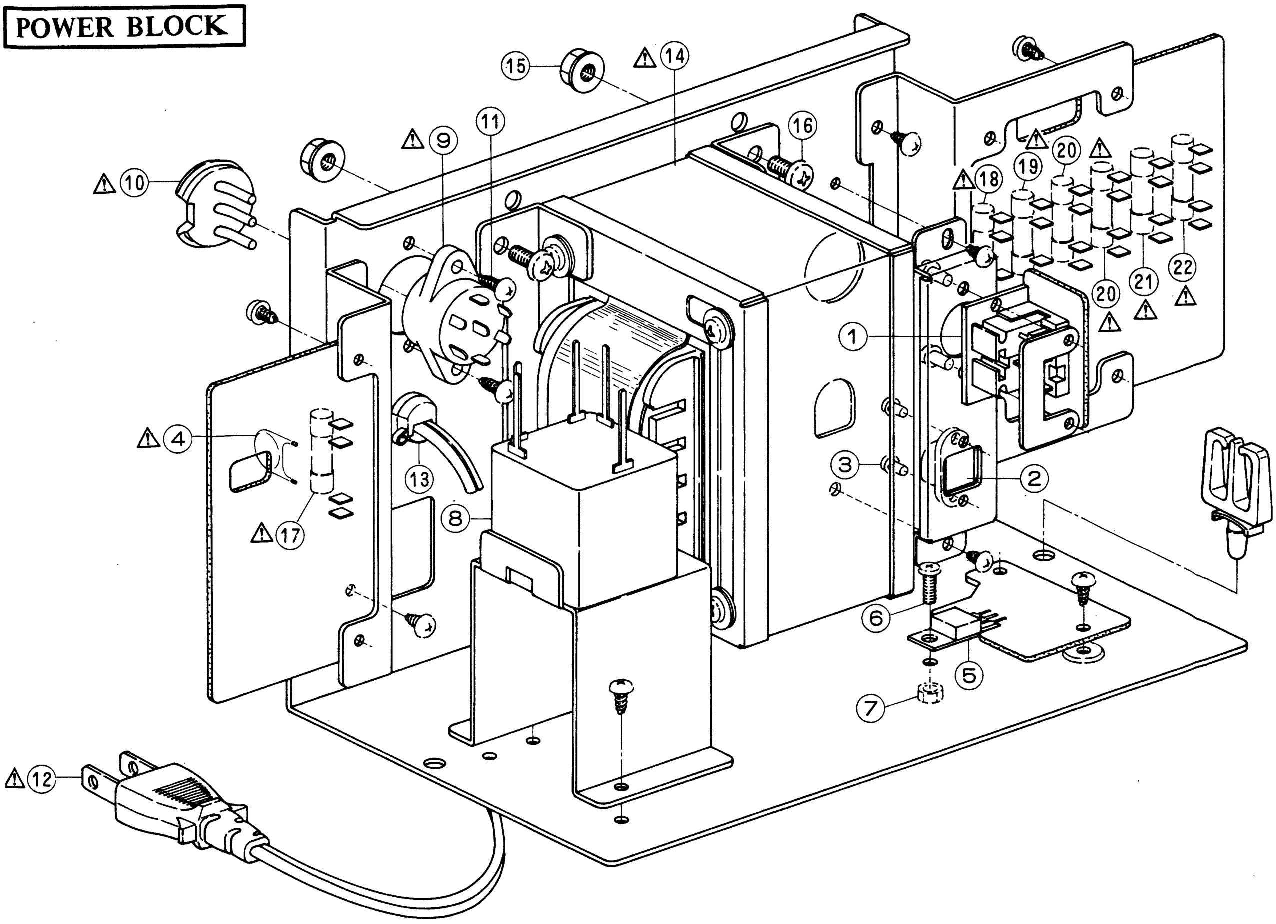
## 4. ROLLER TABLE (L/R) BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 4-1x | BZ-T1009A140A | ROLLER TABLE (L) BLK GX-747 |
| 4-1x | BZ-T1009A140B | ROLLER TABLE (L) BLK GX-747-BL |
| 4-2 | ZS-422076 | PAN30×05STL CMT |
| 4-3 | ML-331001 | DAMPER ARM |
| 4-4 | SZ-332462 | CUSHION ARM |
| 4-5 | ML-331000 | MOTOR ARM |
| 4-6 | ZW-318099 | NUT M9 |
| 4-7 | ZW-321513 | PW26×080×100NYL |
| 4-8 | ZW-618884 | N20STL CMT 1 |
| 4-9 | BZ-T1009A150A | CLUTCH BLK GX-747 |
| 4-10 | ZW-321437 | PUSH WASHER |
| 4-11 | BZ-T1009A160A | DAMPER BLK GX-747 |
| 4-12 | ZS-419670 | PAN30×12STL CMT |
| 4-13 | ZS-319473 | BID26×18STL CMT |
| 4-14 | ZS-670004 | PAN23×16STL CMT |
| 4-15 | ZG-567685 | AZIMUTH SPRING (1) |
| 4-16 | ZW-313873 | PW105×140×050NYL |
| 4-17 | ZW-313872 | PW105×140×013PSL |
| 4-18 | ZW-307294 | RING C 930SUP PKR |
| 4-19 | MR-308713 | COUNTER ROLLER |
| 4-20 | MB-331022 | ROLLER BELT |
| 4-21 | ZW-308928 | PW24×070×020TFL |
| | **MICRO SW (L/R) BLOCK** | |
| 4-22 | ES-326720 | SW MICRO VV-S-01 (SW905) |
| 4-23 | ES-319156 | SW MICRO SS-1-E-4 UC (SW906) |
| | **GEAR BASE BLOCK** | |
| 4-24 | BZ-T1009A190A | GEAR BASE BLK GX-747(1) |
| 4-25 | BM-319631 | ⚠ MOTOR VA208B01 |
| 4-26 | MR-331010 | MOTOR PULLEY |
| 4-27 | ZS-477876 | PAN20×03STL CMT |
| 4-28 | MZ-331006 | GEAR (A) |
| 4-29 | MB-331021 | TENSION ARM BELT |
| 4-30 | MZ-331008 | GEAR (B) |
| 4-31 | MZ-331009 | GEAR (C) |
| 4-32 | ZW-331851 | WASHER PUSH 1.6×3.2×0.25 PSL |
| | **TENSION WHEEL (L/R) BLOCK** | |
| 4-33 | MI-308707 | TENSION WHEEL |
| 4-33x | MI-315558 | TENSION WHEEL (BL) |
| 4-34 | HZ-308710 | TAPE GUIDE (B) |
| 4-35 | EZ-308712 | INSULATOR BUSH |
| 4-36 | MZ-535072 | INSULATOR BUSH (A) |
| 4-37 | HZ-331013 | TAPE GUIDE |
| 4-38 | ZS-422965 | PAN30×15STL CMT |
| 4-39 | ZS-572242 | CTS26×06STL CMT |
| 4-40 | ZS-479474 | PAN26×05STL CMT |
| 4-41 | ZG-312399 | SP T1-3.2/0.2-31.5 T1-049 |
| | **ROLLER TABLE (R) BLOCK** | |
| 4-42x | BZ-T1009A220A | ROLLER TABLE (R) BLK GX-747 |
| 4-42x | BZ-T1009A220B | ROLLER TABLE (R) BLK GX-747-BL |
| 4-43 | MR-331011 | ROLLER PULLEY |
| 4-44 | ZG-331019 | SP ROLLER BASE |
| 4-45 | ZS-608253 | PAN30×20STL CMT |

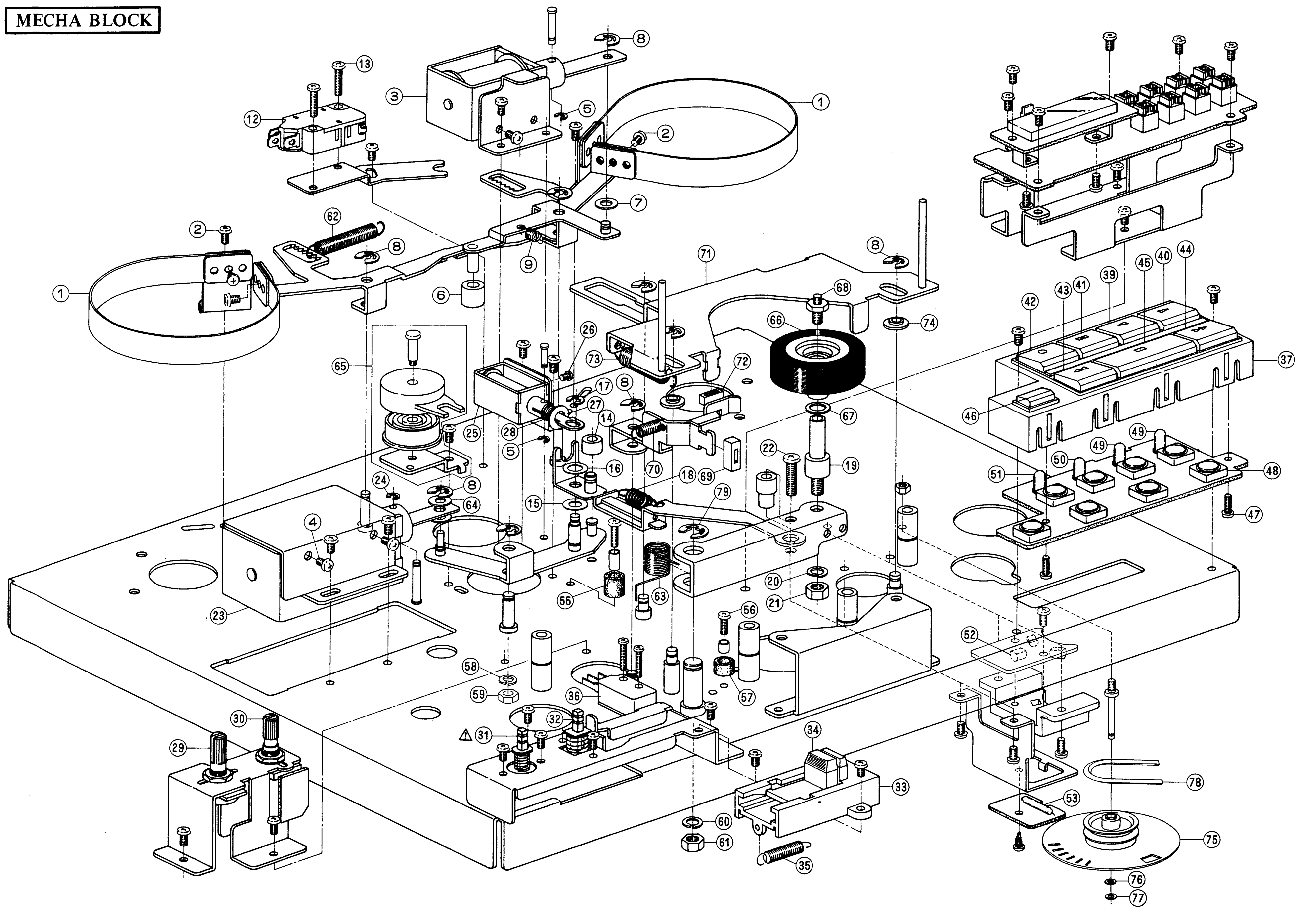
## POWER BLOCK



## 5. POWER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| | **REMOTE CONTROL P.C BOARD BLOCK** | |
| 5-1 | EJ-324276 | DIN J TCS4680-01-111 P 8P |
| | **SOCKET BASE BLOCK** | |
| 5-2 | EJ-310203 | PLUG CONNECTOR EC0630-020 2P (P902) |
| 5-3 | ZS-322839 | PAN23x05BRS BNI |
| | **FUSE P.C BOARD BLOCK** | |
| 5-4 | EC-320548 | ⚠ C CE V F 103Z 250AC (U,J) (C1) |
| | **POWER BLOCK** | |
| 5-5 | ET-308947 | ⚠ TR 2SC2336B Q,R (TR1) |
| 5-6 | ZS-421806 | PAN30×08STL CMT |
| 5-7 | ZW-516993 | N30STL CMT 1 |
| 5-8 | EC-316065 | C MMY V HFV SPECIAL 250AC (C901) |
| 5-9 | EJ-262732 | ⚠ SOCKET SELECTOR S-17223 U 7P (U)(VS1) |
| 5-10 | EJ-249467 | ⚠ PLUG VOLTAGE SELECTOR S-17207 3P (U)(P901) |
| 5-11 | ZS-463353 | T2BR30×08STL BNI |
| 5-12 | EW-374894 | ⚠ AC CORD 2 CORES VM-0129A J (U) |
| 5-12x | EW-524845 | ⚠ AC CORD 2 CORES VM1165B (J) |
| 5-13 | SZ-631945 | STRAIN RELIEF SR-4N-4 |
| 5-14 | BT-330329 | ⚠ TRANS POWER TTT-1 (J)(T901) |
| 5-14x | BT-344145 | ⚠ TRANS POWER T1109J (J)(T901) |
| 5-15 | ZW-413267 | N FRANGE 40STL CMT |
| 5-16 | ZS-435273 | BID40×10STL CMT |
| 5-17 | EF-691007 | ⚠ FUSE SEMKO T 250V 3.15A (U) (F1) |
| 5-17x | EF-326639 | ⚠ FUSE TSC A 250V 3.15A (J)(F1) |
| 5-18 | EF-306949 | ⚠ FUSE TSC A 250V 1.25A (U,J) (F2) |
| 5-19 | EF-309388 | ⚠ FUSE TSC A 250V 0.80A (U,J)(F3) |
| 5-20 | EF-327103 | ⚠ FUSE TSC A 250V 0.50A (U,J) (F4,5) |
| 5-21 | EF-306949 | ⚠ FUSE TSC A 250V 1.25A (U,J)(F6) |
| 5-22 | EF-311839 | ⚠ FUSE TSC A 250V 1.6A (U,J)(F7) |

**MECHA BLOCK**



## 6. MECHA BLOCK

### BRAKE LEVER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-1 | MT-314987 | BRAKE BAND |
| 6-2 | ZS-417216 | PAN30×04STL CMT |

### BRAKE PLUNGER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-3 | EP-315918 | ⚠ SOLENOID 1240PLTI (SL903) |
| 6-4 | ZS-422076 | PAN30×05STL CMT |
| 6-5 | ZW-270088 | RING E 190SUP CMT |
| 6-6 | MZ-397181 | LEVER CUSHION |
| 6-7 | ZW-420682 | PW42×090×050NYL |
| 6-8 | ZW-290283 | RING U 285SUP CMT |
| 6-9 | ZG-580522 | CLUTCH LEVER SPRING |
| 6-10x | ZW-616004 | PW31×080×100STL CMT |
| 6-11x | ZS-323728 | BID30×05STL CMT |

### SW PLATE BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-12 | ES-573478 | SW MICRO K3 UC |
| 6-13 | ZS-419670 | PAN30×12STL CMT |

### P PLUNGER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-14 | MB-428343 | KD STOPPER RUBBER |
| 6-15 | ZW-405865 | PW51×103×050NYL |
| 6-16 | ZW-260043 | PW61×100×020NYL |
| 6-17 | ZW-270123 | RING E400SUP CMT |
| 6-18 | ZG-308728 | P SPRING |
| 6-19 | MS-527591 | PINCH ROLLER SHAFT |
| 6-20 | ZW-274026 | SW50 |
| 6-21 | ZW-413278 | N50STL CMT 1 |
| 6-22 | ZS-444262 | BID40×18STL CMT |

### PR PLUNGER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-23 | EP-316121 | ⚠ SOLENOID 1664PLTI (SL904) |
| 6-24 | ZW-357164 | RING E230SUP CMT |

### PAUSE PLUNGER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-25 | EP-330363 | ⚠SOLENOID 0730FLT2 29V (SL901) |
| 6-26 | ZS-592378 | PAN26×03STL CMT |
| 6-27 | ZW-313593 | PW51×103×050PBR |
| 6-28 | ZG-308734 | JOINT SPRING |

### VOLUME BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-29 | EV-319625 | VR ROTARY 16L10×0QB102 (VR901) |

### ROTARY SELECTOR BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-30 | ES-306714 | SW ROTARY SRU1023N 1-02-03N (SW1) |

### POWER SW BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-31 | ES-330887 | ⚠SW PUSH ESB-70411S 01-1ESB (U)(SW901) |
| 6-31x | ES-330888 | ⚠SW PUSH ESB-70240R 01-1J (J)(SW901) |

### REEL SIZE SW BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-32 | ES-330993 | SW PUSH SUE-12 2-04-02N (SW903) |

### SLIDE BOX BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-33 | SZ-331037A | SLIDE BOX |
| 6-33x | TC-331037B | SLIDE BOX (BL) |
| 6-34 | TC-331038A | CUE SLIDE |
| 6-34x | TC-331038B | CUE SLIDE (BL) |
| 6-35 | ZG-331565 | SP T2-5.0/0.32-28.0 T2-144 |

### MICRO SW BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-36 | ES-326720 | SW MICRO VV-S-01 (SW904) |

### OPERATION BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-37 | SE-331024A | OPERATE ESCUTCHEON |
| 6-37x | SE-331024B | OPERATE ESCUTCHEON (BL) |
| 6-38x | SB-331025 | OPERATE BUTTON |
| 6-39 | SB-B603905 | OPERATION KEY (A) PART |
| 6-39x | SB-B603901 | OPERATION KEY (A)-BL PART |
| 6-40 | SB-B603906 | OPERATION KEY (B) PART |
| 6-40x | SB-B603902 | OPERATION KEY (B)-BL PART |
| 6-41 | SB-B603907 | OPERATION KEY (C) PART |
| 6-41x | SB-B603903 | OPERATION KEY (C)-BL PART |
| 6-42 | SB-B603908 | OPERATION KEY (F) PART |
| 6-42x | SB-B603904 | OPERATION KEY (F)-BL PART |
| 6-43 | SB-331026D | OPERATION KEY (D) |
| 6-43x | SB-331026K | OPERATION KEY (D)-BL |
| 6-44 | SB-331026E | OPERATION KEY (E) |
| 6-44x | SB-331026L | OPERATION KEY (E)-BL |
| 6-45 | SB-331027A | OPERATION KEY (G) |
| 6-45x | SB-331027B | OPERATION KEY (G)-BL |
| 6-46 | SB-331028A | OPERATION KEY (H) |
| 6-46x | SB-331028B | OPERATION KEY (H)-BL |
| 6-47 | ZS-602190 | T2BR26×06STL CMT |

### OPERATION P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-48 | ES-315362 | SW TACT AKC8S (SW1to8) |
| 6-49 | ED-330995 | D LED SLP-260C GRN (D1,2) |
| 6-50 | ED-330996 | D LED GL-5HY5 YLW (D3) |
| 6-51 | ED-330997 | D LED GL-5PR5 RED (D4) |

### DETECTION (A) P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-52 | ET-324539 | TR PHOTO PT-410C C (TR1to3) |

### DETECTION (B) P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-53 | EL-324540 | PL H LEAD 12V 55mA (IN1) |

### MECHA BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 6-54x | SA-312529 | RUBBER FOOT (A-2) PART (P) |
| 6-55 | MB-606712 | KJ STOPPER RUBBER |
| 6-56 | ZS-419670 | PAN30×12STL CMT |
| 6-57 | MB-428343 | KD STOPPER RUBBER |
| 6-58 | ZW-273914 | SW40 |
| 6-59 | ZW-413188 | N40STL CMT 1 |
| 6-60 | ZW-274026 | SW50 |
| 6-61 | ZW-413278 | N50STL CMT 1 |
| 6-62 | ZG-313078 | SP T1-6.3/0.5-50.0 T1-190 |
| 6-63 | ZG-301340 | PINCH ROLLER SPRING |
| 6-64 | ZW-420682 | PW42×090×050NYL |
| 6-65 | BZ-T1009A080A | PR DAMPER BLK GX-747 |
| 6-66 | MP-B424023 | PINCH ROLLER PART KD |
| 6-67 | ZW-376391 | PW61×100×013PSL |
| 6-68 | ZS-527681 | PINCH ROLLER SET SCREW |
| 6-69 | MB-668801 | TE STOPPER RUBBER (B) |
| 6-70 | ZG-313028 | SP T1-5.0/0.32-20.0 T1-141 |
| 6-71 | ML-B330939 | SHIFTER SLIDE PART |
| 6-72 | VT-422673 | BRAKE RUBBER BUSH |
| 6-73 | ZG-317114 | TENSION LEVER SPRING |
| 6-74 | ZW-580173 | GUIDE WASHER |
| 6-75 | MR-330945 | DETECTION PULLEY |
| 6-76 | ZW-305546 | PW21×040×025PSL |
| 6-77 | ZW-321437 | PUSH WASHER |
| 6-78 | MB-330938 | DETECTION BELT |
| 6-79 | ZW-270156 | RING E 600SUP CMT |

# 7. SYS. CON P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 7-1 | BA-T1009A430E | PC SYS CON BLK GX-747dbx |
| 7-IC1 | EI-330984 | IC μPD553C-152 |
| 7-IC2 | EI-330985 | IC μPD553C-110 |
| 7-IC3,4 | EI-696363 | IC MC14049BCP |
| 7-IC5,6 | EI-330352 | IC BA6109 |
| 7-IC7,8 | EI-257602 | IC MC14011BCP |
| 7-TR1 | ET-639437 | ⚠ TR 2SC945L Q,P |
| 7-TR2 | ET-375603 | ⚠ TR 2SC1061 B,C |
| 7-TR3to6 | ET-639437 | TR 2SC945L Q,P |
| 7-TR7,8 | ET-554657 | TR 2SA733A P,Q |
| 7-TR9 | ET-639437 | TR 2SC945L Q,P |
| 7-TR10 | ET-554657 | TR 2SA733A P,Q |
| 7-TR11 | ET-639437 | TR 2SC945L Q,P |
| 7-TR12 | ET-375603 | ⚠ TR 2SC1061 B,C |
| 7-TR13 | ET-402682 | ⚠ TR 2SC1061 C |
| 7-TR14 | ET-639437 | ⚠ TR 2SC945L Q,P |
| 7-TR15 | ET-554657 | TR 2SA733A P,Q |
| 7-TR16to22 | ET-639437 | TR 2SC945L Q,P |
| 7-TR23 | ET-399846 | TR 2SC945L Q |
| 7-TR24to27 | ET-311336 | TR 2SC2130 H |
| 7-TR28to31 | ET-308937 | TR 2SC2130 G,H |
| 7-TR34 | ET-311336 | TR 2SC2130 H |
| 7-TR35to38 | ET-639437 | TR 2SC945L Q,P |
| 7-TR39,40 | ET-635220 | TR 2SC945L K,P |
| 7-TR41 | ET-639437 | TR 2SC945L Q,P |
| 7-TR42 | ET-308937 | ⚠ TR 2SC2130 G,H |
| 7-TR43,44 | ET-554657 | TR 2SA733A P,Q |
| 7-TR45,46 | ET-639437 | TR 2SC945L Q,P |
| 7-TR47,48 | ET-666415 | TR 2SB605 K,L |
| 7-TR49,50 | ET-666404 | TR 2SD571 K,L |
| 7-TR51,52 | ET-639437 | TR 2SC945L Q,P |
| 7-TR53 | ET-311336 | TR 2SC2130 H |
| 7-TR54,55 | ET-639437 | TR 2SC945L Q,P |
| 7-TR57 | ET-307349 | ⚠ TR 2SD794 P,Q |
| 7-TR58to65 | ET-554657 | TR 2SA733A P,Q |
| 7-TR66to72 | ET-635220 | TR 2SC945L K,P |
| 7-TR73to84 | ET-639437 | TR 2SC945L Q,P |
| 7-TR85to87 | ET-554657 | TR 2SA733A P,Q |
| 7-TR89to91 | ET-639437 | TR 2SC945L Q,P |
| 7-TR93to96 | ET-554657 | TR 2SA733A P,Q |
| 7-TR97,98 | ET-639437 | TR 2SC945L Q,P |
| 7-TR99,100 | ET-311336 | TR 2SC2130 H |
| 7-D1,2 | ED-330987 | ⚠ D SILICON RB152 200/1.5A |
| 7-D3,4 | ED-326168 | ⚠ D SILICON 1D4B1 200/1.5A |
| 7-D5 | ED-330987 | ⚠ D SILICON RB152 200/1.5A |
| 7-D6 | ED-313566 | ⚠ D SILICON GP-25G 400/2.5A |
| 7-D7 | ED-324526 | D ZENER H HZ12 C1 |
| 7-D8to10 | ED-560913 | D SILICON V 1S2473VE |
| 7-D11 | ED-329051 | D ZENER H HZ24 3 |
| 7-D12 | ED-330988 | D ZENER H HZ11 C2 |
| 7-D13 | ED-331185 | D ZENER V HZ12 C2 |
| 7-D14to27 | ED-560913 | D SILICON V 1S2473VE |
| 7-D28,29 | ED-494583 | D SILICON 10D05 50/1.0A |
| 7-D30,31 | ED-560913 | D SILICON V 1S2473VE |
| 7-D32to35 | ED-224550 | D SILICON 10D4 400/1.0A |
| 7-D36 | ED-323979 | D SILICON W03B F12 100/1.0A |
| 7-D37to41 | ED-324669 | ⚠ D SILICON 10D4-FA-2 F12 400/1.0A |
| 7-D42 | ED-224550 | ⚠ D SILICON 10D4 400/1.0A |
| 7-D43 | ED-324669 | ⚠ D SILICON 10D4-FA-2 F12 400/1.0A |
| 7-D44 | ED-224550 | ⚠ D SILICON 10D4 400/1.0A |
| 7-D45,46 | ED-322982 | D GERMA V 1S188FM-1-LR F07 |
| 7-D47to50 | ED-560913 | D SILICON V 1S2473VE |
| 7-D51 | ED-330988 | D ZENER H HZ11 C2 |
| 7-D52to69 | ED-560913 | D SILICON V 1S2473VE |
| 7-D70,71 | ED-306109 | D SILICON W03B 100/1.0A |
| 7-D72to75 | ED-560913 | D SILICON V 1S2473VE |
| 7-D78,79 | ED-302295 | D ZENER H HZ7 C3 |
| 7-D80 | ED-308952 | D GERMA V 1K34A-LR F07 |
| 7-D81to86 | ED-560913 | D SILICON V 1S2473VE |
| 7-D87 | ED-302269 | D ZENER H HZ5 A2 |
| 7-SCR1,2 | ED-324667 | ⚠ D THYRISTOR 2P1M 100V 2A |
| 7-SCR3,4 | ED-324668 | ⚠ D THYRISTOR AC03BGML 200V 3A |
| 7-SR1 | ED-330361 | D COMP 03-0034 |
| 7-SR2 | ED-330362 | D COMP 03-0035 |
| 7-SR3,4 | ER-330356 | COMP R 01-0031 |
| 7-SR5 | ER-330355 | COMP R 01-0291 |
| 7-SR6 | ER-330357 | COMP R 01-0292 |
| 7-SR7 | ER-330358 | COMP R 01-0293 |
| 7-SR8 | ER-330359 | COMP R 01-0294 |
| 7-SR9 | ER-330360 | COMP R 01-0295 |
| 7-SR10 | ER-330354 | COMP R 01-0290 |
| 7-SW1 | ES-309094 | SW SLIDE SL13-6-6-2-2 2-02-02N |
| 7-VR1 | EV-330980 | R S-FIX V V18K3-2 (4US) T3P 503 |
| 7-VR2 | EV-330981 | R S-FIX V V18K3-2 (4US) T3P 203 |
| 7-VR3 | EV-341258 | R S-FIX V V8K1-1 3P 304 |
| 7-RL1to4 | EP-300132 | RELAY POWER MY4-02-US-L 4TR 24V |
| 7-RL5 | EP-324672 | RELAY POWER FBR321D012-K 2TR 12V |
| 7-RL6 | EP-330351 | RELAY SIGNAL G2KU 1TR 24V |
| 7-RL7 | EP-308949 | RELAY POWER FBR211BD024-M 1TR 24V |
| 7-CR1to16 | ER-300820 | SPARK QUENCHER CRU 104C+121R 125AC |
| 7-PH1 | EZ-324787 | FHOTO SENSOR TLP504 |
| 7-IFT1,2 | EO-330353 | COIL IFT 12A1295 400KHz |
| 7-R26 | ER-330680 | ⚠ R CB H FS RDS 1/4W 331J |
| 7-R27 | ER-330677 | ⚠ R CB H FS RDS 1/4W 181J |
| 7-R30 | ER-331187 | ⚠ R OMF H FS 1W 272J |
| 7-R32,33 | ER-201798 | ⚠ R OMF H FS 2W 820J |
| 7-R34 | ER-336841 | ⚠ R OMF H S15 FS 1W 332J |
| 7-R123 | ER-315356 | ⚠ R CT P 20W 551K |
| 7-R124 | ER-308955 | ⚠ R CT P 20W 360K |
| 7-R125 | ER-324670 | ⚠ R OMF H S20 FS 2W 102J |
| 7-R131 | ER-324670 | ⚠ R OMF H S20 FS 2W 102J |
| 7-R173 | ER-330979 | ⚠ R OMF H FS 1W 621J |
| 7-R214to220 | ER-303342 | ⚠ R OMF H FS 1W 331J |
| 7-FR1 | ER-328520 | ⚠ R FUSE ERD2FC S10 1/4W 1000G |
| 7-FR2,3 | ER-326167 | ⚠ R FUSE 20W 390K |
| 7-FR4 | ER-326169 | ⚠ R FUSE ERD2FC S10 1/4W 22R0G |
| 7-C1,2 | EC-316188 | C EC V CUT SM 102M 25DC |
| 7-C5 | EC-324662 | C EC V CUT SM 222M 25DC |
| 7-C18 | EC-316189 | C EC V F05 SM 1R0M 100DC |
| 7-C19 | EC-316192 | C COMP V ECW-R 155J 180AC |
| 7-C20 | EC-342928 | C COMP V ECW-R 355J 180AC |
| 7-C34 | EC-331243 | C EC V S10 TSL 471 160DC |
| 7-C36to38 | EC-316194 | C MMY V CUT CF921 474K 250DC |
| 7-C54 | EC-316194 | C MMY V CUT CF921 474K 250DC |
| 7-C64 | EC-326583 | C MMY V CUT CF921 473K 400DC |

## 8. PRE AMP P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 8-1 | BA-T1015A060A | PC PRE AMP BLK GX-747dbx |
| 8-IC1 | EI-307644 | IC NJM4556D |
| 8-TR1 | ET-346113 | TR 2SC3068 |
| 8-TR3 | ET-328440 | ⚠ TR 2SD863-V8 E,F |
| 8-TR4 | ET-517263 | TR 2SC1312R G,H |
| 8-TR5 | ET-639437 | ⚠ TR 2SC945L Q,P |
| 8-TR6 | ET-200399 | ⚠ TR 2SB856 B,C |
| 8-TR7 | ET-517263 | ⚠ TR 2SC1312R G,H |
| 8-TR8,9 | ET-328440 | ⚠ TR 2SD863-V8 E,F |
| 8-TR10,11 | ET-308954 | TR 2SC1844 E,F |
| 8-TR12 | ET-639437 | TR 2SC945L Q,P |
| 8-TR13 | ET-391768 | TR 2SC458LG C,D |
| 8-TR14 | ET-338181 | TR 2SC2909 R,S |
| 8-TR16 | ET-639437 | TR 2SC945L Q,P |
| 8-TR19 to23 | ET-639437 | TR 2SC945L Q,P |
| 8-TR24 | ET-318237 | ⚠ TR 2SB764 E,F |
| 8-TR25 | ET-517263 | ⚠ TR 2SC1312R G,H |
| 8-TR26,27 | ET-517263 | TR 2SC1312R G,H |
| 8-D1to3 | ED-301911 | D SILICON H DS448 |
| 8-D4,5 | ED-308953 | D GERMA H 1K34A-LH S12 |
| 8-D8to12 | ED-301911 | D SILICON H DS448 |
| 8-D14,15 | ED-301911 | D SILICON H DS448 |
| 8-D16 | ED-313623 | D ZENER H HZ22 3 |
| 8-D17 to25 | ED-301911 | D SILICON H DS448 |
| 8-J1 | EJ-308986 | PIN J 1784P1782 P 4P |
| 8-J2 | EJ-331184 | PHONE J HLJ0345-100 2×2P |
| 8-J3 | EJ-330545 | PHONE J 3P HLJ0315-020 6.3 |
| 8-SW1 | ES-301435 | SW SLIDE CL210E 2-10-02S |
| 8-SW2 | ES-330372 | SW PUSH SUE24 2-THROW |
| 8-SW3,4 | ES-319464 | SW LEVER 00420460 2-04-02S |
| 8-SW5 | ES-319448 | SW LEVER 00420461 2-04-02N |
| 8-SW6 | ES-306714 | SW ROTARY SRU1023N 1-02-03N |
| 8-SW7 | ES-301436 | SW SLIDE CL206E 2-06-02S |
| 8-VR1to3 | EV-336849 | R S-FIX H KVSF807U 3P 203 |
| 8-VR4 | EV-336853 | R S-FIX H KVSF807U 3P 103 |
| 8-VR5,6 | EV-341225 | R S-FIX H KVSF807U 3P 503 |
| 8-VR7 | EV-319316 | VR ROTARY 16P20×2A B103 |
| 8-VR8 | EV-336852 | R S-FIX H KVSF807U 3P 102 |
| 8-VR9 | EV-336843 | R S-FIX H KVSF807U 3P 303 |
| 8-VC1,2 | EC-330991 | C S-FIX H ECR-BC090M11 8.0-90 |
| 8-VL1 | EO-319495 | COIL VARI1 GYD-102 1mH |
| 8-L1,2 | EO-330990 | COIL FIX 2 0358-042 510μH |
| 8-T1 | EO-331190 | COIL OSC 1 2330-065 100KHz |
| 8-FL1 | EO-315758 | COIL TUN 1 100S-431 100KHz |
| 8-FL2 | EO-319447 | COIL TUN1 GYD-100K 100KHz |
| 8-RL1,2 | EP-308973 | RELAY LEAD LAB2NS 2NO 24V |
| 8-FR1 | ER-308898 | ⚠ R FUSE FR25SJ 1/4W 101J |
| 8-F2,3 | ER-331188 | ⚠ R FUSE ERD2FC S10 1/4W 8R2J |
| 8-R7 | ER-331562 | R OMF H S15 FS 1W 471J |
| 8-C20 | EC-325380 | C PP V F10 PFH 332J 630DC |
| 8-C28 | EC-341409 | C COMP V AWS 6801G 50DC |

## 9. NR P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 9-1 | BA-T1015A010A | PC NR BLK GX-747dbx |
| 9-IC1 | EI-344144 | IC μPC1252H2 |
| 9-IC2 | EI-344148 | IC μPC1253H2 |
| 9-IC3 | EI-337360 | IC μPC4082C |
| 9-IC4 | EI-344144 | IC μPC1252H2 |
| 9-IC5 | EI-344148 | IC μPC1253H2 |
| 9-IC6 | EI-337360 | IC μPC4082C |
| 9-IC7 | EI-336994 | IC M5230L |
| 9-TR1 to4 | ET-330270 | TR 2SC2320 F,G |
| 9-TR5 | ET-318237 | TR 2SB764 E,F |
| 9-TR6 | ET-328440 | TR 2SD863-V8 E,F |
| 9-SW1 | ES-344143 | SW PUSH SUL192A 2-06-02N |
| 9-VR1to4 | EV-330531 | R S-FIX H TM8KV2-1S 3P 0.50W 503 |
| 9-VR5,6 | EV-341239 | R S-FIX H TM8KV2-1S 3P 0.50W 504 |
| 9-VR7 | EV-341235 | R S-FIX H TM8KV2-1S 3P 0.50W 103 |
| 9-R2 | ER-338325 | R MF H 1/4W 4302F |
| 9-R3 | ER-323487 | R MF H F10 1/4W 1503F |
| 9-R5 | ER-310326 | R MF H 1/4W 1002F |
| 9-R6 | ER-330272 | R MF H F10 1/4W 3302F |
| 9-R11 | ER-310326 | R MF H 1/4W 1002F |
| 9-R12 | ER-330272 | R MF H F10 1/4W 3302F |
| 9-R14 | ER-338325 | R MF H 1/4W 4302F |
| 9-R15 | ER-323487 | R MF H F10 1/4W 1503F |
| 9-R16 | ER-318316 | R MF H F10 1/4W 2201F |
| 9-R17 | ER-302353 | R MF H F10 1/4W 2701F |
| 9-R18 | ER-318337 | R MF H F10 1/4W 6801F |
| 9-R20 | ER-329282 | R MF H F10 1/4W 2702F |
| 9-R21 | ER-314603 | R MF H 1/4W 3001F |
| 9-R22 | ER-346169 | R SD 1/4W 226J |
| 9-R26 | ER-346158 | R MF H T26 1/4W 1694F |
| 9-R33 | ER-310326 | R MF H 1/4W 1002F |
| 9-R34 | ER-330272 | R MF H F10 1/4W 3302F |
| 9-R39 | ER-310326 | R MF H 1/4W 1002F |
| 9-R40 | ER-330259 | R MF H T26 1/4W 3302F |
| 9-R41 | ER-338325 | R MF H 1/4W 4302F |
| 9-R42 | ER-319986 | R MF H T26 1/4W 1503F |
| 9-R43 | ER-318316 | R MF H F10 1/4W 2201F |
| 9-R44 | ER-302353 | R MF H F10 1/4W 2701F |
| 9-R45 | ER-318337 | R MF H F10 1/4W 6801F |
| 9-R47 | ER-329282 | R MF H F10 1/4W 2702F |
| 9-R48 | ER-307651 | R MF H F10 1/4W 3301F |
| 9-R49 | RR-346169 | R SD 1/4W 226J |
| 9-R53 | ER-346158 | R MF H T26 1/4W 1694F |
| 9-R60 | ER-309809 | R MF V 1/4W 6201F |
| 9-R61 | ER-311773 | R MF H 1/4W 3301F |
| 9-R64 | ER-341399 | R MF H 1/4W 1502F |
| 9-R65 | ER-341399 | R MF H 1/4W 1502F |
| 9-R66 | ER-304948 | ⚠R CB H FS RDS 1/2W 821J |
| 9-R69 | ER-314672 | R MF V 1/4W 1602F |
| 9-C3 | EC-344134 | C COMP V AWS 1002G 50DC |
| 9-C8 | EC-337002 | C EC V F05 NP NXA 100M 16DC |
| 9-C11,12 | EC-343879 | C PP V F03 FPS 3301G 100DC |
| 9-C15 | EC-343879 | C PP V F03 FPS 3301G 100DC |
| 9-C17 | EC-346114 | C TT V DN 100J 25DC |
| 9-C19 | EC-337261 | C EC V F05 NP NXA 1R0M 50DC |
| 9-C23 | EC-344134 | C COMP V AWS 1002G 50DC |
| 9-C27,28 | EC-343879 | C PP V F03 FPS 3301G 100DC |
| 9-C31 | EC-343879 | C PP V F03 FPS 3301G 100DC |
| 9-C33 | EC-346114 | C TT V DN 100J 25DC |

## 10. MIC P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 10-1 | BA-T1015A050A | PC MIC BLK GX-747dbx |
| 10-TR1 | ET-308954 | TR 2SC1844 E,F |
| 10-TR2,3 | ET-337258 | TR 2SC1843 E,F |
| 10-TR4 | ET-308954 | TR 2SC1844 E,F |
| 10-TR5 | ET-338181 | TR 2SC2909 R,S |
| 10-TR6 | ET-338244 | TR 2SA1207 R,S |
| 10-VR1,2 | EV-319494 | VR ROTARY 16P11×0U A503 A503 |
| 10-C1 | EC-343863 | C PP V F03 FPS 5600G 100DC |
| 10-C2 | EC-346170 | C TT V DN 100K 16DC |
| 10-C3 | EC-343857 | C PP V F03 FPS 3300G 100DC |

## 11. COUNTER P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 11-D1to6 | ED-316143 | D SILICON H 1S2473HS F10 |
| 11-D7 | ED-322247 | D LED SLP-151D RED |
| 11-SW1to4 | ES-319624 | SW TACT KEC11903 |
| 11-SW5to8 | ES-323367 | SW TACT KEC10001 |
| 11-IN1 | EM-330992 | IND LE SL-1574W CHARACTER |

## 12. METER P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 12-TR1,2 | ET-517263 | TR 2SC1312R G,H |
| 12-R6 | ER-281338 | ⚠R OMF H FS 2W 100J |

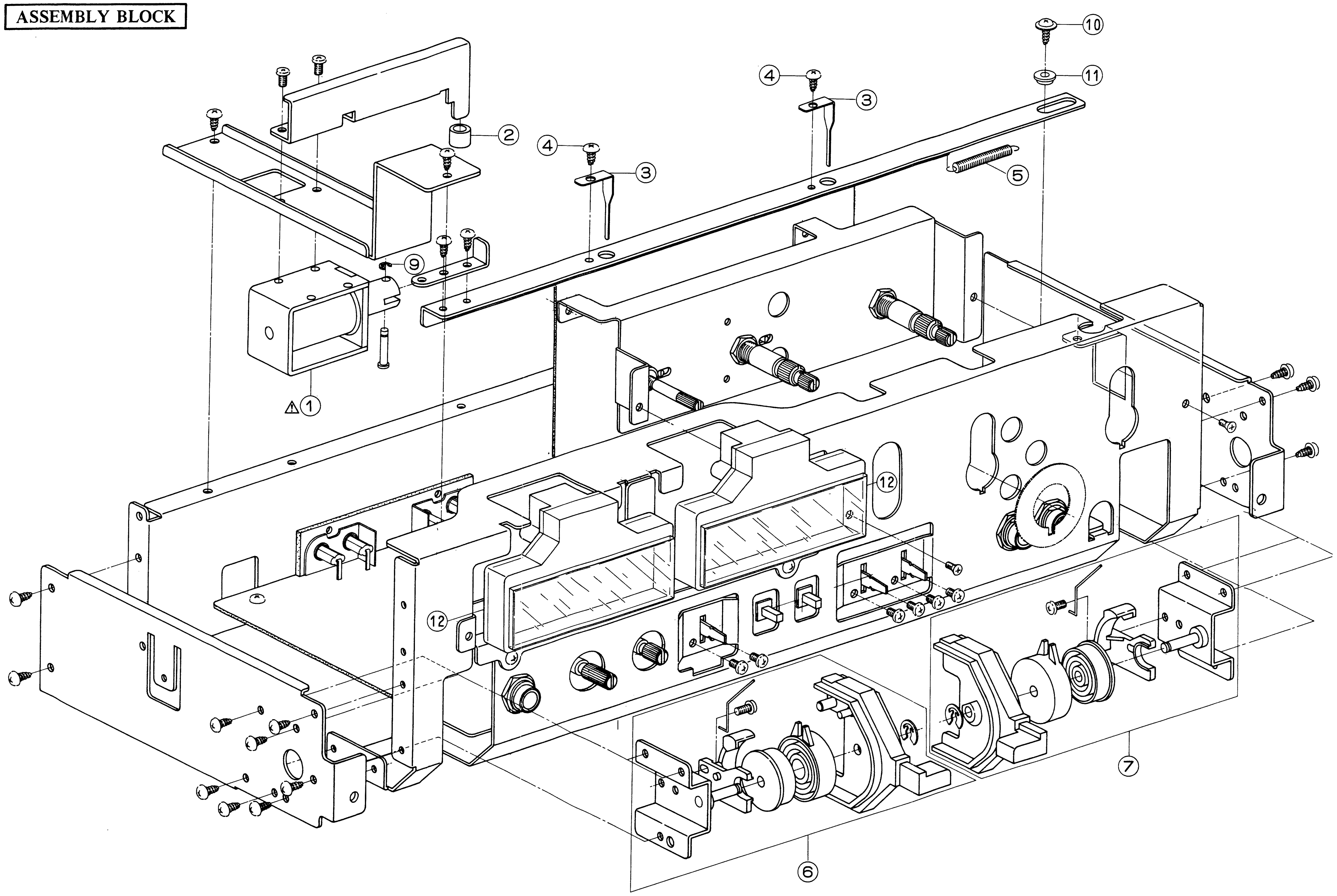
## 13. LED P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 13-D1 | ED-337414 | D LED SLP-235B GRN |

## 14. BIAS P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| 14-VR1 | EV-331189 | VR ROTARY 16P20×2B B502 |

## ASSEMBLY BLOCK

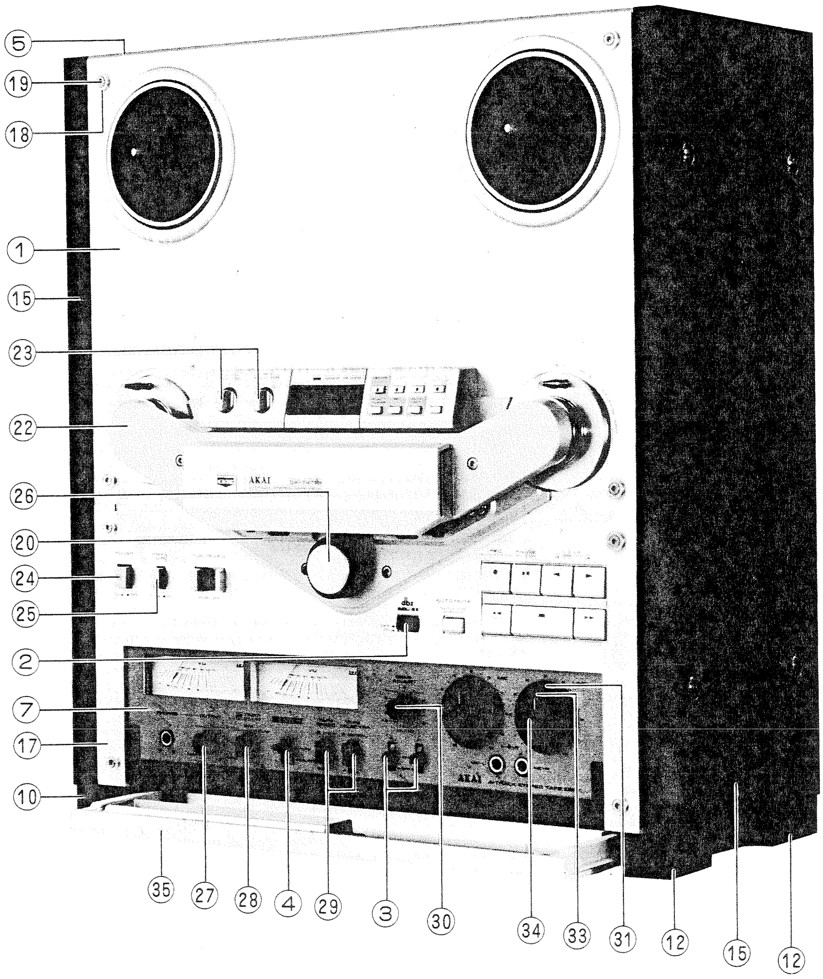


## 15. ASSEMBLY BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| | **REVERSE PLUNGER BLOCK** | |
| 15-1 | EP-315918 | ⚠ SOLENOID 1240PLTI (SL905) |
| 15-2 | MB-606712 | KJ STOPPER RUBBER |
| | **REVERSE ARM BLOCK** | |
| 15-3 | ZG-331069 | SP REVERSE |
| 15-4 | ZS-325495 | T2BR30×06STL CMT |
| 15-5 | ZG-313004 | SP T1-4.0/0.4-35.5 T1-118 |

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| | **ASSEMBLY BLOCK** | |
| 15-6 | BZ-T1009A450A | HINGE BASE (L) BLK GX-747 |
| 15-7 | BZ-T1009A460A | HINGE BASE (R) BLK GX-747 |
| 15-8x | ZW-263946 | RV NYL40×05O |
| 15-9 | ZW-270088 | RING E 190SUP CMT |
| 15-10 | ZS-331566 | PAN30×08STL CMT CUP |
| 15-11 | ZW-625241 | GRADUATED WASHER |
| 15-12 | EM-330374 | METER VU D64A24L 0.260mA (ME1,2) |
| 15-12x | EM-330600 | METER VU D64A27L 0.260mA (BL) (ME1,2) |

# FINALY ASSEMBLY BLOCK



## 16. FINALY ASSEMBLY BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|---|---|---|
| | **MECHA PANEL BLOCK** | |
| 16-1 | BD-T1009A540A | MECHA PANEL BLK GX-747 |
| 16-1x | BD-T1009A540B | MECHA PANEL BLK GX-747-BL |
| | **FINALY ASSEMBLY BLOCK** | |
| 16-2 | SK-B604516 | JOINT KNOB PART |
| 16-3 | SK-328684 | KNOB LEVER (C) |
| 16-4 | ML-328683 | KNOB LEVER (B) |
| 16-5 | SP-304933A | UPPER COVER |
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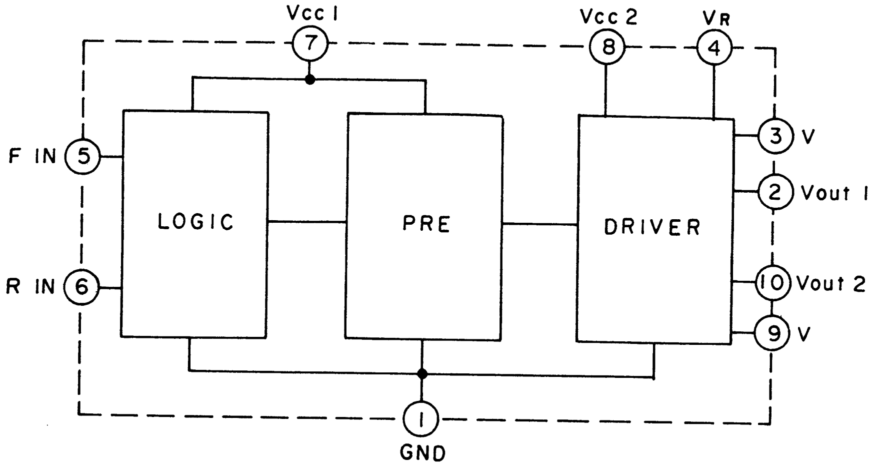
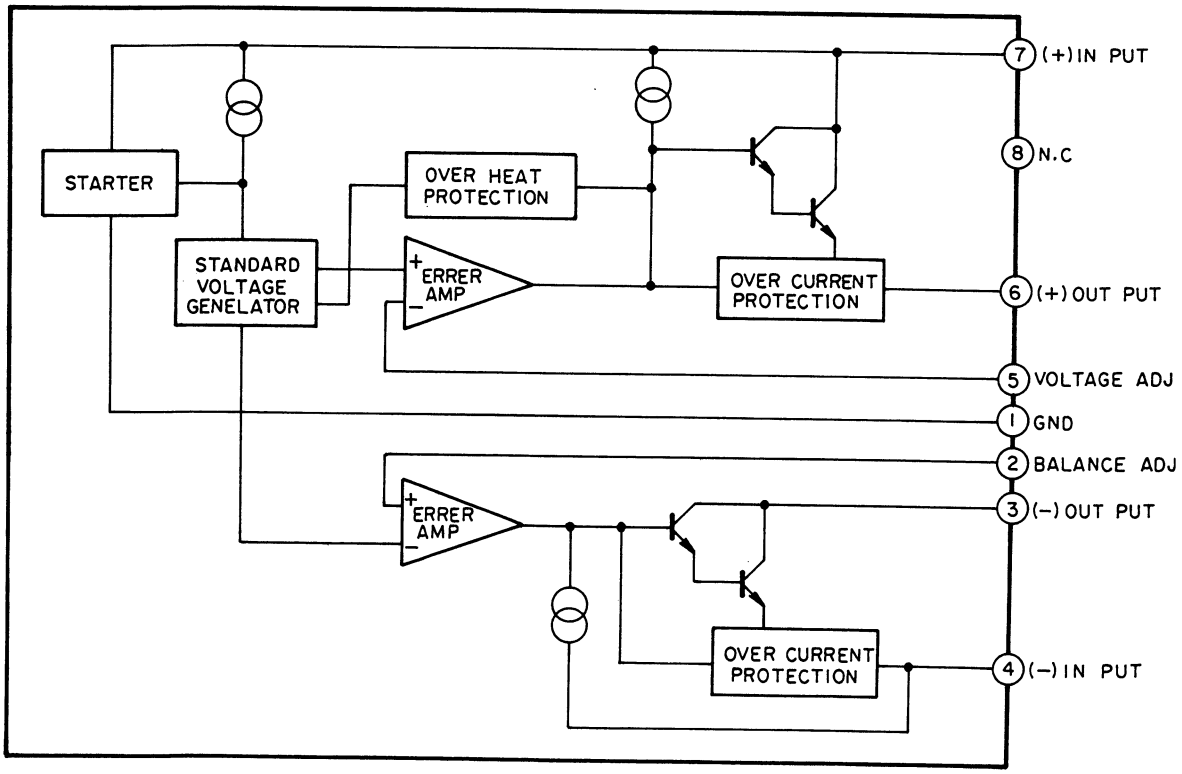


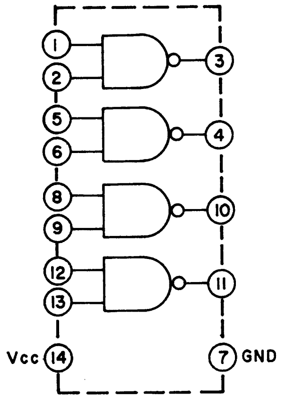
Vcc I
7
Vcc 2
8
VR
4
F IN 5
R IN 6
LOGIC
PRE
DRIVER
3 V
2 Vout I
10 Vout 2
9 V
1
GND

**M5230L**

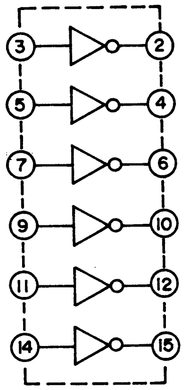


7 (+) IN PUT
8 N.C
STARTER
OVER HEAT PROTECTION
STANDARD VOLTAGE GENELATOR
+ ERRER AMP −
OVER CURRENT PROTECTION
6 (+) OUT PUT
5 VOLTAGE ADJ
1 GND
2 BALANCE ADJ
+ ERRER AMP −
3 (−) OUT PUT
OVER CURRENT PROTECTION
4 (−) IN PUT

## MC14011BCP

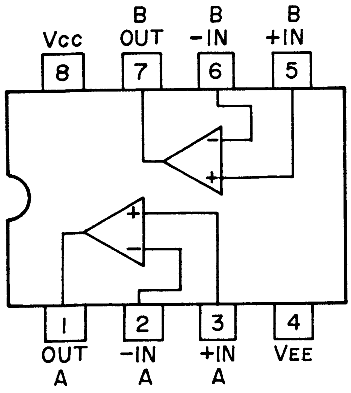

1
2
3
5
6
4
8
9
10
12
13
11
Vcc 14
7 GND

## MC14049 BCPN

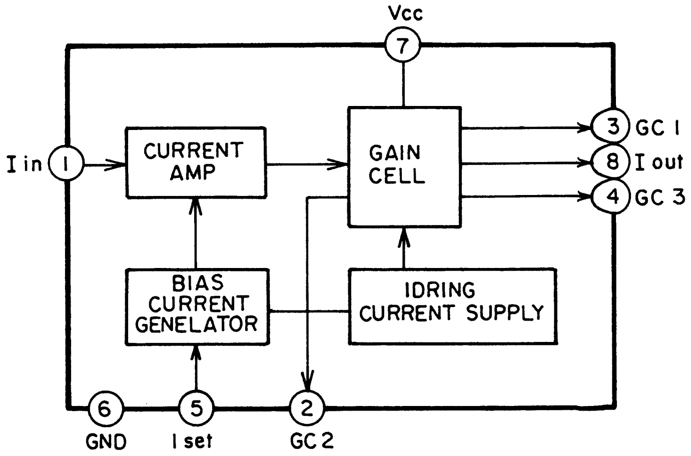

3
2
5
4
7
6
9
10
11
12
14
15

NC= Pin 13.16
VSS= Pin 8
VCC= Pin 1

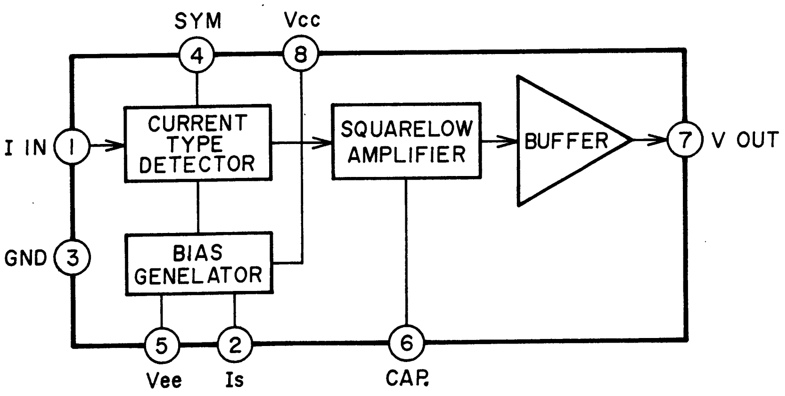
## NJM4558D/μPC4082C


Vcc
B OUT
B −IN
B +IN
8
7
6
5
−
+
+
−
1
2
3
4
OUT A
−IN A
+IN A
VEE

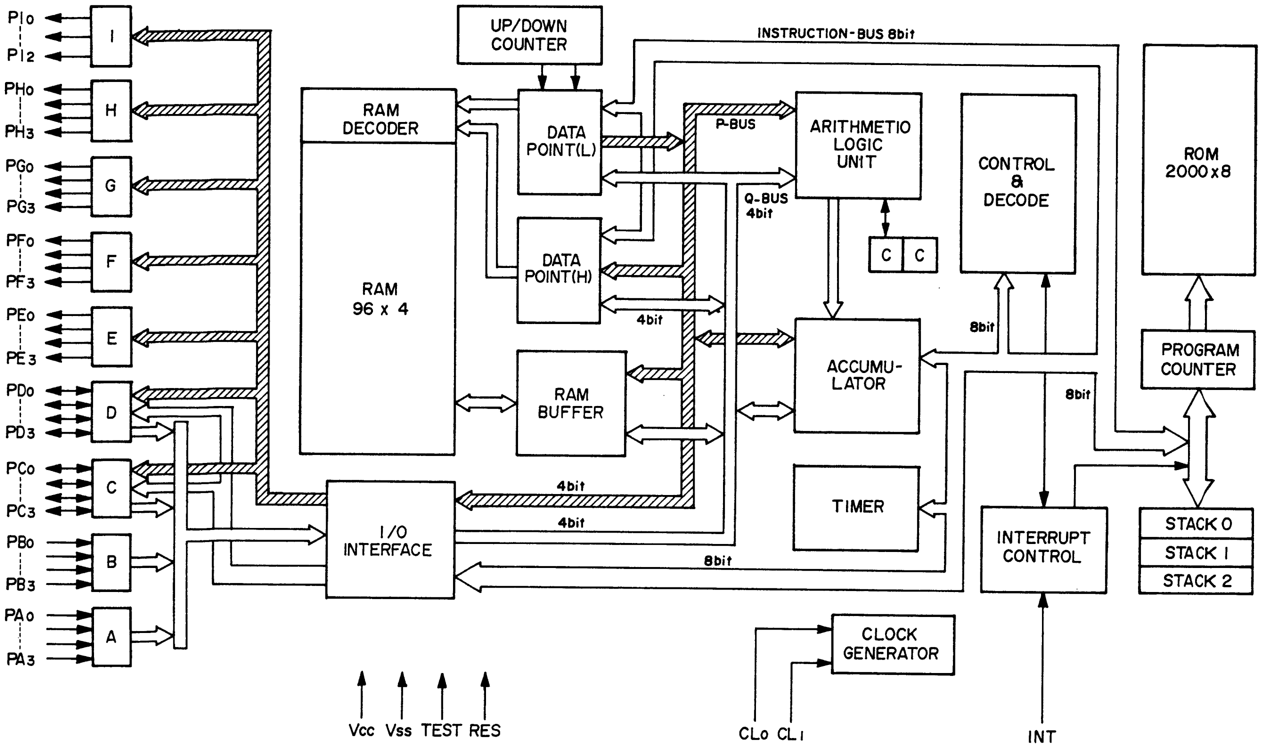
## μPC1252H2


Vcc
7
I in
1
CURRENT AMP
GAIN CELL
3 GC 1
8 I out
4 GC 3
BIAS CURRENT GENELATOR
IDRING CURRENT SUPPLY
6
5
2
GND
I set
GC 2

## μPC1253H2

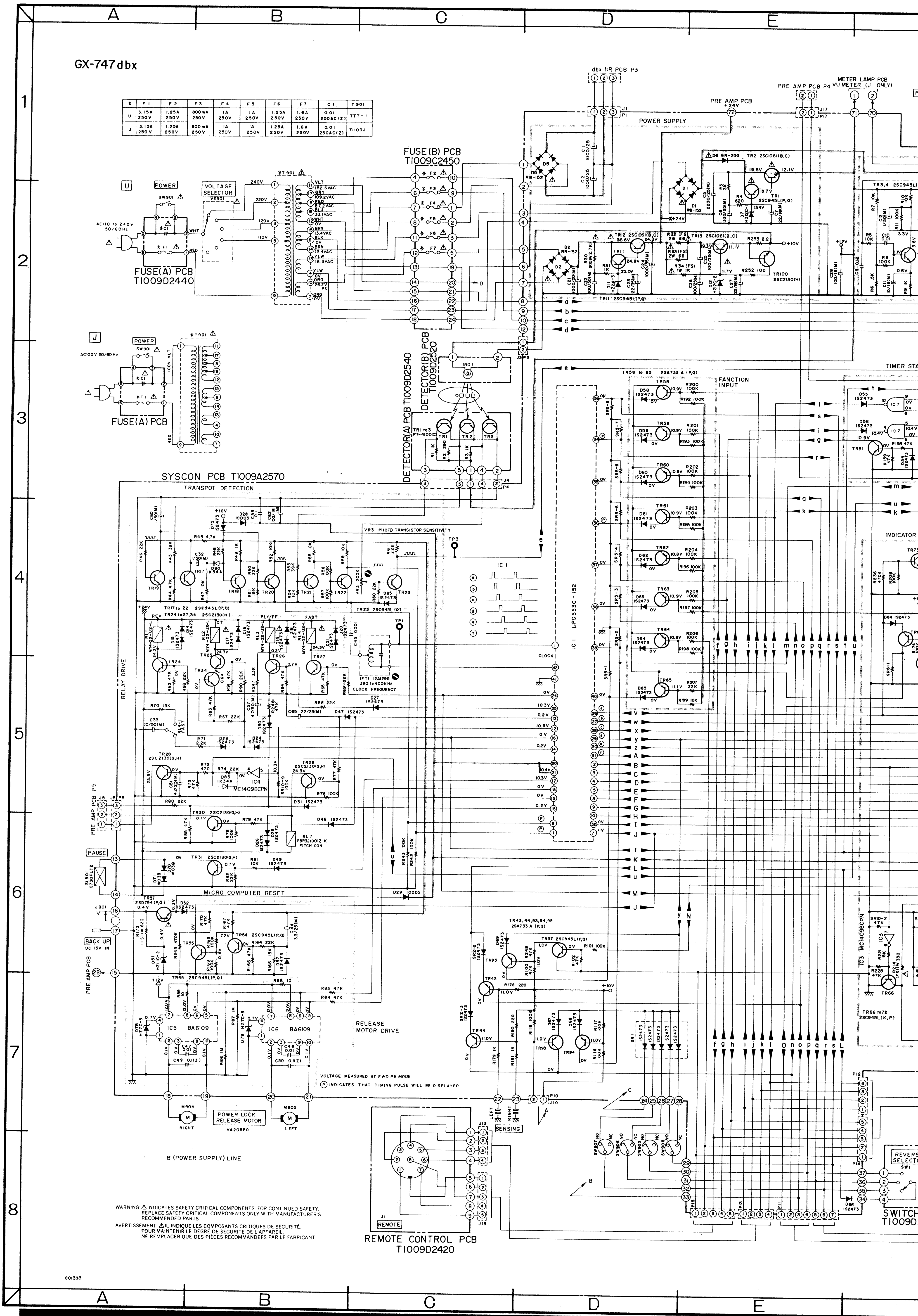

SYM
Vcc
4
8
I IN
1
CURRENT TYPE DETECTOR
SQUARELOW AMPLIFIER
BUFFER
7 V OUT
GND
3
BIAS GENELATOR
5
2
6
Vee
Is
CAP.

## μPD5530-152/110


PI0
PI2
PH0
PH3
PG0
PG3
PF0
PF3
PE0
PE3
PD0
PD3
PC0
PC3
PB0
PB3
PA0
PA3
I
H
G
F
E
D
C
B
A
UP/DOWN COUNTER
INSTRUCTION-BUS 8bit
RAM DECODER
DATA POINT(L)
P-BUS
ARITHMETIC LOGIC UNIT
CONTROL & DECODE
ROM 2000x8
Q-BUS 4bit
C
C
DATA POINT(H)
RAM 96 x 4
4bit
8bit
ACCUMU-LATOR
PROGRAM COUNTER
RAM BUFFER
8bit
TIMER
4bit
4bit
I/O INTERFACE
8bit
INTERRUPT CONTROL
STACK 0
STACK 1
STACK 2
CLOCK GENERATOR
Vcc
Vss
TEST
RES
CL0
CL1
INT

## GX-747dbx

| ※ | F 1 | F 2 | F 3 | F 4 | F 5 | F 6 | F 7 | C 1 | T 901 |
|---|---|---|---|---|---|---|---|---|---|
| U | 3.15A<br>250V | 1.25A<br>250V | 800mA<br>250V | 1A<br>250V | 1A<br>250V | 1.25A<br>250V | 1.6A<br>250V | 0.01<br>250AC(Z) | TTT-1 |
| J | 3.15A<br>250V | 1.25A<br>250V | 800mA<br>250V | 1A<br>250V | 1A<br>250V | 1.25A<br>250V | 1.6A<br>250V | 0.01<br>250AC(Z) | T1109J |



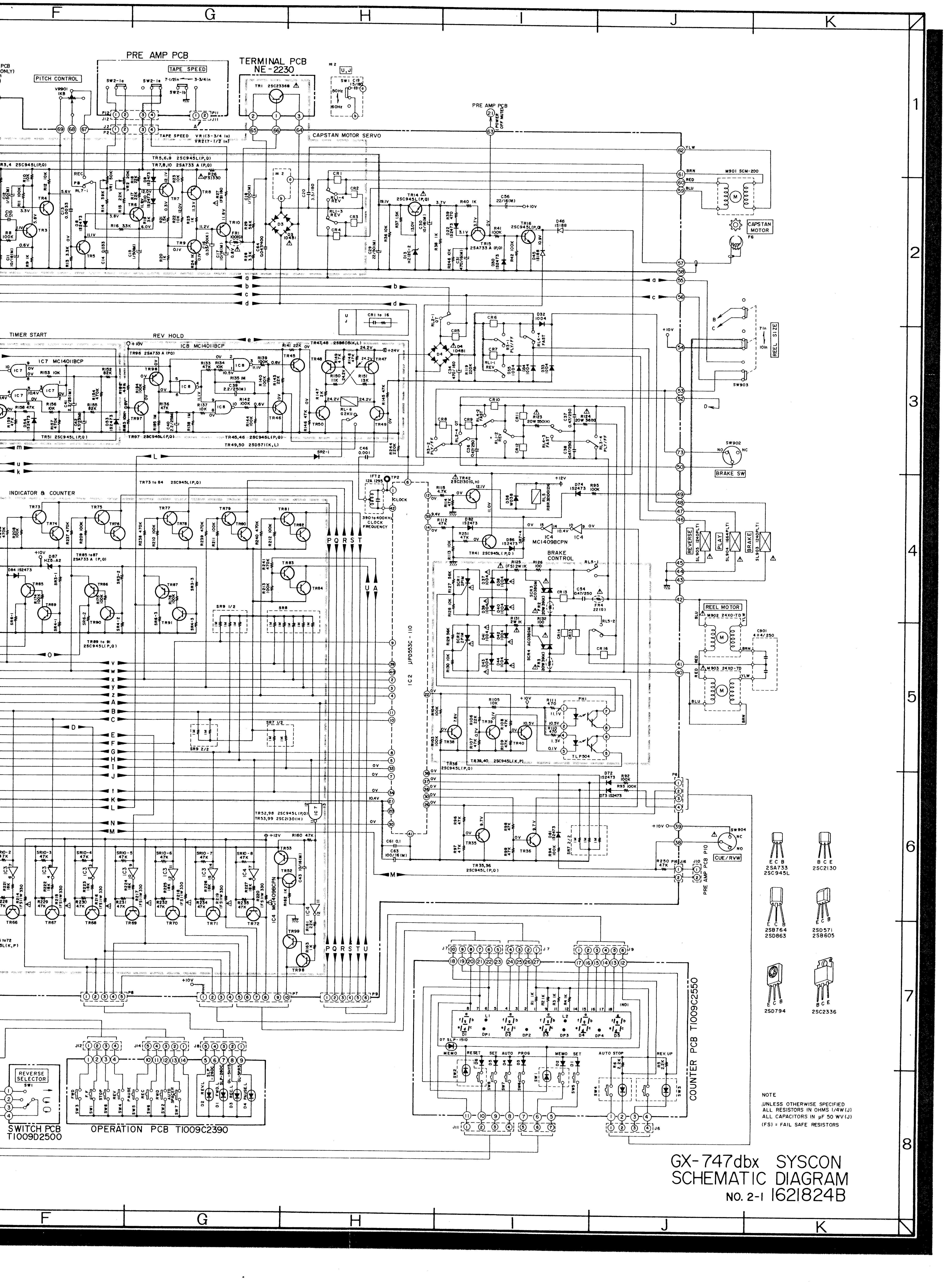
A
B
C
D
E
1
2
3
4
5
6
7
8
dbx NR PCB P3
PRE AMP PCB
POWER SUPPLY
PRE AMP PCB P4
METER LAMP PCB
VU METER (J ONLY)
FUSE(B) PCB
T1009C2450
U
POWER
SW901
VOLTAGE SELECTOR
VS901
※T901
240V
220V
120V
110V
AC110 to 240V 50/60Hz
FUSE(A) PCB
T1009D2440
J
AC100V 50/60Hz
FUSE(A) PCB
DETECTOR(A) PCB T1009D2540
DETECTOR(B) PCB T1009D2520
SYSCON PCB T1009A2570
TRANSPOT DETECTION
VR3 PHOTO TRANSISTOR SENSITIVITY
IC1 μPD553C-152
FANCTION INPUT
TIMER STA
INDICATOR
RELAY DRIVE
REV
PLY/FF
FAST
CLOCK FREQUENCY
MICRO COMPUTER RESET
PAUSE
BACK UP DC 15V IN
PRE AMP PCB P5
RELEASE MOTOR DRIVE
IC5 BA6109
IC6 BA6109
VOLTAGE MEASURED AT FWD PB MODE
Ⓟ INDICATES THAT TIMING PULSE WILL BE DISPLAYED
M904 RIGHT
M905 LEFT
POWER LOCK RELEASE MOTOR
VA208801
SENSING
REMOTE
REMOTE CONTROL PCB
T1009D2420
REVERSE SELECTOR
SWITCH
T1009D

B (POWER SUPPLY) LINE

WARNING ⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY,
REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S
RECOMMENDED PARTS

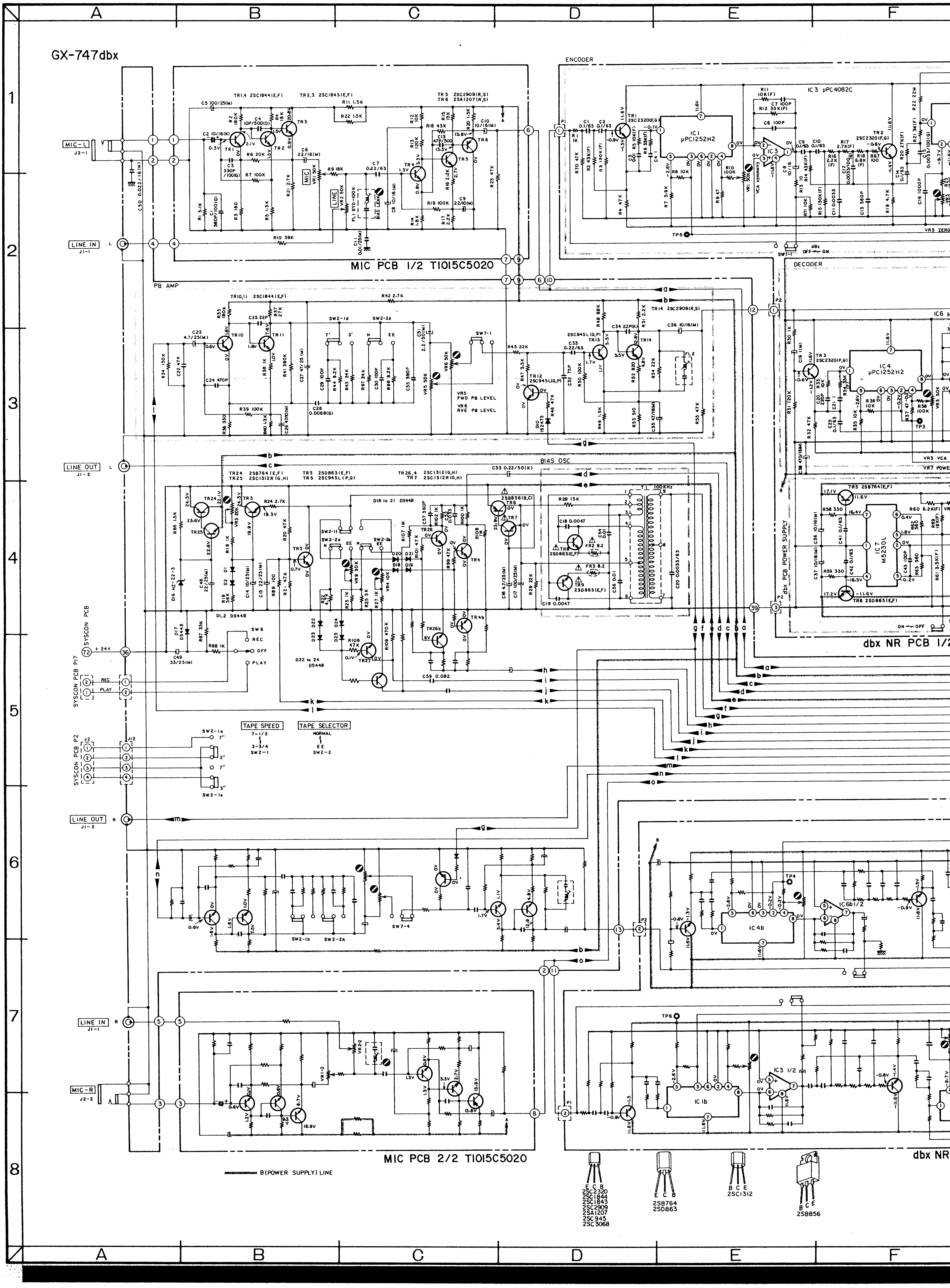
AVERTISSEMENT: ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ
POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL,
NE REMPLACER QUE DES PIÈCES RECOMMANDEES PAR LE FABRICANT

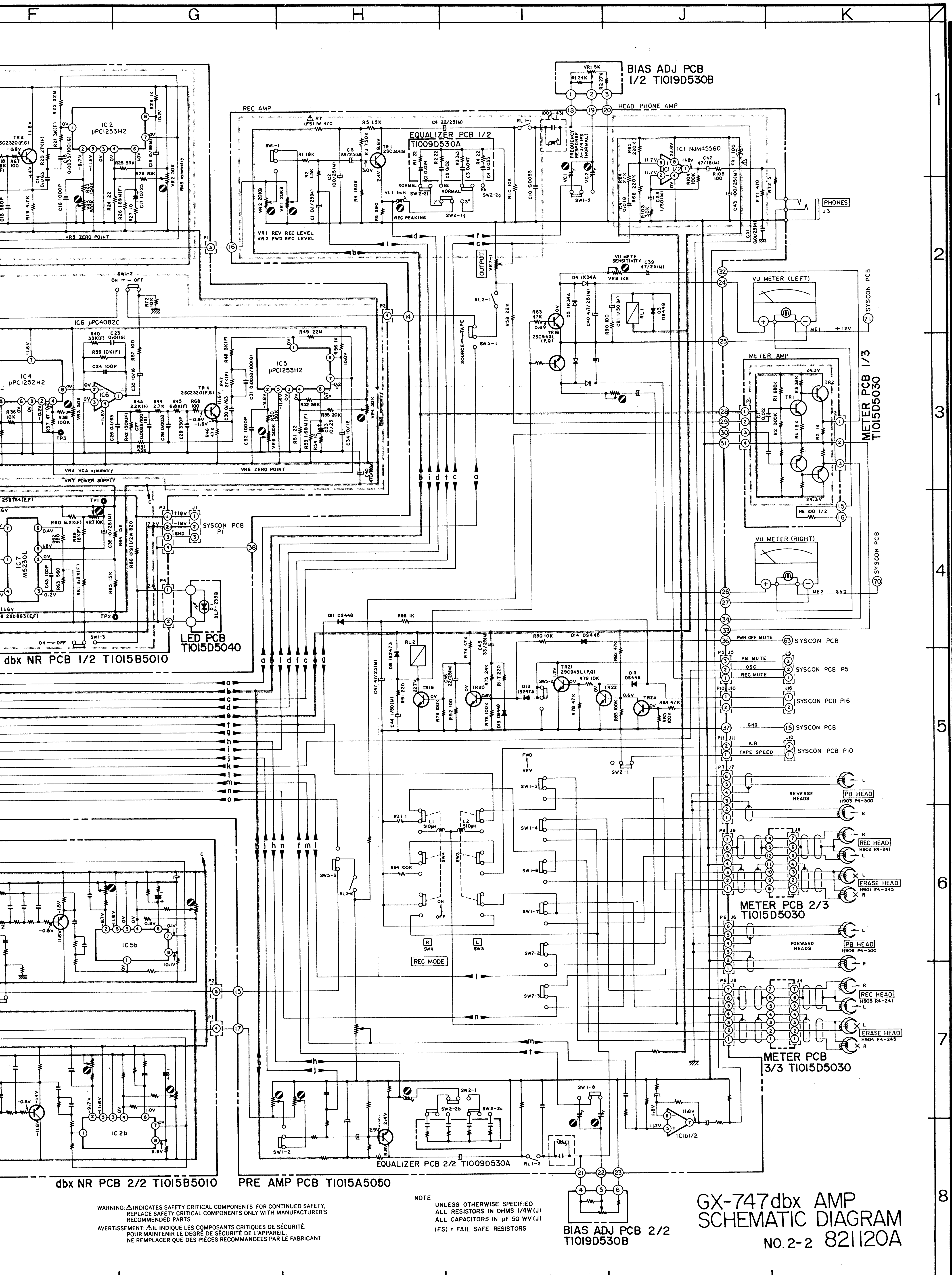
001333


PRE AMP PCB
TAPE SPEED
7-1/2in 3-3/4in
PITCH CONTROL
VR901 1KB
TERMINAL PCB
NE-2230
TR1 2SC2336B
CAPSTAN MOTOR SERVO
PRE AMP PCB
POWER OFF MUTE
TAPE SPEED VR1(3-3/4 in) VR2(7-1/2 in)
TR5,6,9 2SC945L(P,Q)
TR7,8,10 2SA733 A (P,Q)
TR3,4 2SC945L(P,Q)
M901 SCM-200
CAPSTAN MOTOR
TR14 2SC945L(P,Q)
TR15 2SA733 A (P,Q)
TR16 2SC945L(P,Q)
TIMER START
REV HOLD
IC7 MC14011BCP
IC8 MC14011BCP
TR96 2SA733 A (P,Q)
TR47,48 2SB605(K,L)
RL-6 G2KU
TR51 2SC945L(P,Q)
TR97 2SC945L(P,Q)
TR46,46 2SC945L(P,Q)
TR49,50 2SD571(K,L)
CR1 to 16
REEL SIZE
7in
10in
SW903
SW902
BRAKE SW
INDICATOR & COUNTER
TR73 to 84 2SC945L(P,Q)
TR85 to 87 2SA733 A (P,Q)
TR89 to 91 2SC945L(P,Q)
IFT2 12A 1295
TP2
CLOCK
390 to 400KHz CLOCK FREQUENCY
IC2 μPD553C-110
TR42 2SC2130(G,H)
TR41 2SC945L(P,Q)
IC4 MC14098CPN
BRAKE CONTROL
REVERSE SL905 1240PLTI
PLAY SL904 1664PLTI
BRAKE SL903 1240PLTI
REEL MOTOR
M902 24X0-TD
M903 24X0-TD
C901 4+4/250
PH1
TLP504
TR38 2SC945L(P,Q)
TR39,40 2SC945L(K,P)
TR52,98 2SC945L(P,Q)
TR53,99 2SC2130(H)
TR35,36 2SC945L(P,Q)
SW904
CUE/RVW
PRE AMP PCB P10
E C B 2SA733 2SC945L
B C E 2SC2130
E C B 2SB764 2SD863
E C B 2SD571 2SB605
E C B 2SD794
B C E 2SC2336
TR66 to 72 2SC945L(K,P)
IC4 MC14098CPN
REVERSE SELECTOR SW1
SWITCH PCB T1009D2500
OPERATION PCB T1009C2390
COUNTER PCB T1009C2550
D7 SLP-1510
MEMO RESET SET AUTO PROG MEMO SET
AUTO STOP
REV.UP
F G H I J K
1 2 3 4 5 6 7 8

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50 WV(J)
(FS) = FAIL SAFE RESISTORS

GX-747dbx SYSCON
SCHEMATIC DIAGRAM
NO. 2-1 1621824B


GX-747dbx
MIC PCB 1/2 T1015C5020
MIC PCB 2/2 T1015C5020
ENCODER
DECODER
PB AMP
BIAS OSC
dbx NR PCB 1/2
dbx NR
dbx PCB POWER SUPPLY
SYSCON PCB
SYSCON PCB P17
SYSCON PCB P2
MIC-L J2-1
MIC-R J2-2
LINE IN J1-1
LINE OUT J1-2
TAPE SPEED 7-1/2 3-3/4 SW2-1
TAPE SELECTOR NORMAL EE SW2-2
IC1 μPC1252H2
IC3 μPC4082C
IC4 μPC1252H2
IC7 M5230L
VR5 FWD PB LEVEL
VR6 RVE PB LEVEL
VR3 VCA
VR7 POWER
VR5 ZERO
TP3
TP4
TP5
TP6
SW1-1 dbx OFF ON
SW6 REC OFF PLAY
± 24V
REC
PLAY
B (POWER SUPPLY) LINE
E C B 2SC2320 2SC1844 2SC1843 2SC2909 2SA1207 2SC945 2SC3068
E C B 2SB764 2SD863
B C E 2SC1312
B C E 2SB856
A
B
C
D
E
F
1
2
3
4
5
6
7
8


F
G
H
I
J
K
1
2
3
4
5
6
7
8
BIAS ADJ PCB 1/2 T1019D530B
REC AMP
HEAD PHONE AMP
EQUALIZER PCB 1/2 T1009D530A
IC2 μPC1253H2
IC1 NJM4556D
VR5 ZERO POINT
VR1 REV REC LEVEL
VR2 FWD REC LEVEL
REC PEAKING
FREQUENCY RESPONSE 3-3/4 IPS (NORMAL)
PHONES
J3
OUTPUT
SOURCE
TAPE
VU METER SENSITIVITY
VU METER (LEFT)
SYSCON PCB
IC6 μPC4082C
IC4 μPC1252H2
IC5 μPC1253H2
VR3 VCA symmetry
VR6 ZERO POINT
VR7 POWER SUPPLY
RMS symmetry
METER AMP
METER PCB 1/3 T1015D5030
IC7 M5230L
SYSCON PCB P1
LED PCB T1015D5040
SLP-235B
dbx NR PCB 1/2 T1015B5010
VU METER (RIGHT)
PWR OFF MUTE
PB MUTE
OSC
REC MUTE
SYSCON PCB P5
SYSCON PCB P16
GND
A.R
TAPE SPEED
SYSCON PCB P10
REVERSE HEADS
PB HEAD H903 P4-300
REC HEAD H902 R4-241
ERASE HEAD H901 E4-243
METER PCB 2/3 T1015D5030
FORWARD HEADS
PB HEAD H906 P4-300
REC HEAD H905 R4-241
ERASE HEAD H904 E4-243
METER PCB 3/3 T1015D5030
FWD
REV
REC MODE
IC5b
IC2b
IC1b 1/2
EQUALIZER PCB 2/2 T1009D530A
dbx NR PCB 2/2 T1015B5010
PRE AMP PCB T1015A5050
BIAS ADJ PCB 2/2 T1019D530B

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDEES PAR LE FABRICANT

NOTE

UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50 WV(J)
(FS) = FAIL SAFE RESISTORS

# GX-747dbx AMP SCHEMATIC DIAGRAM

NO. 2-2 821120A

# ABBREVIATIONS USED IN GX-747 dbx SERVICE MANUAL

| Abbreviation | Explanation |
|---|---|
| BPF | Band Pass Filter |
| D (range) | Dynamic (Range) |
| EE (tape) | Extra Efficiency (Tape) |
| EQ | EQualizer |
| FF | Fast Forward |
| $f_H$ | High cut-off frequency |
| $f_L$ | Low cut-off frequency |
| FWD | ForWarD |
| GND | GrouND |
| H | High |
| HPF | High Pass Filter |
| L | Low |
| LED | Light Emitting Diode |
| LPF | Low Pass Filter |
| M | Motor |
| MOL | Maximum Output Level |
| NAB | National Association of Broadcasters |
| NR | Noise Reduction |
| Oct | Octave e.g. 12 dB/oct |
| PLY | PLaY |
| REMOCON | REMOte CONtrol |
| REV | REVerse |
| REW | REWind |
| RMS | Root Mean Square |
| RWD | ReWinD |
| SYSCON | SYStem CONtrol |
| TP | Test Point |
| VCA | Voltage Controlled Attenuator or Amplifier |
| VR | Variable Resistor |